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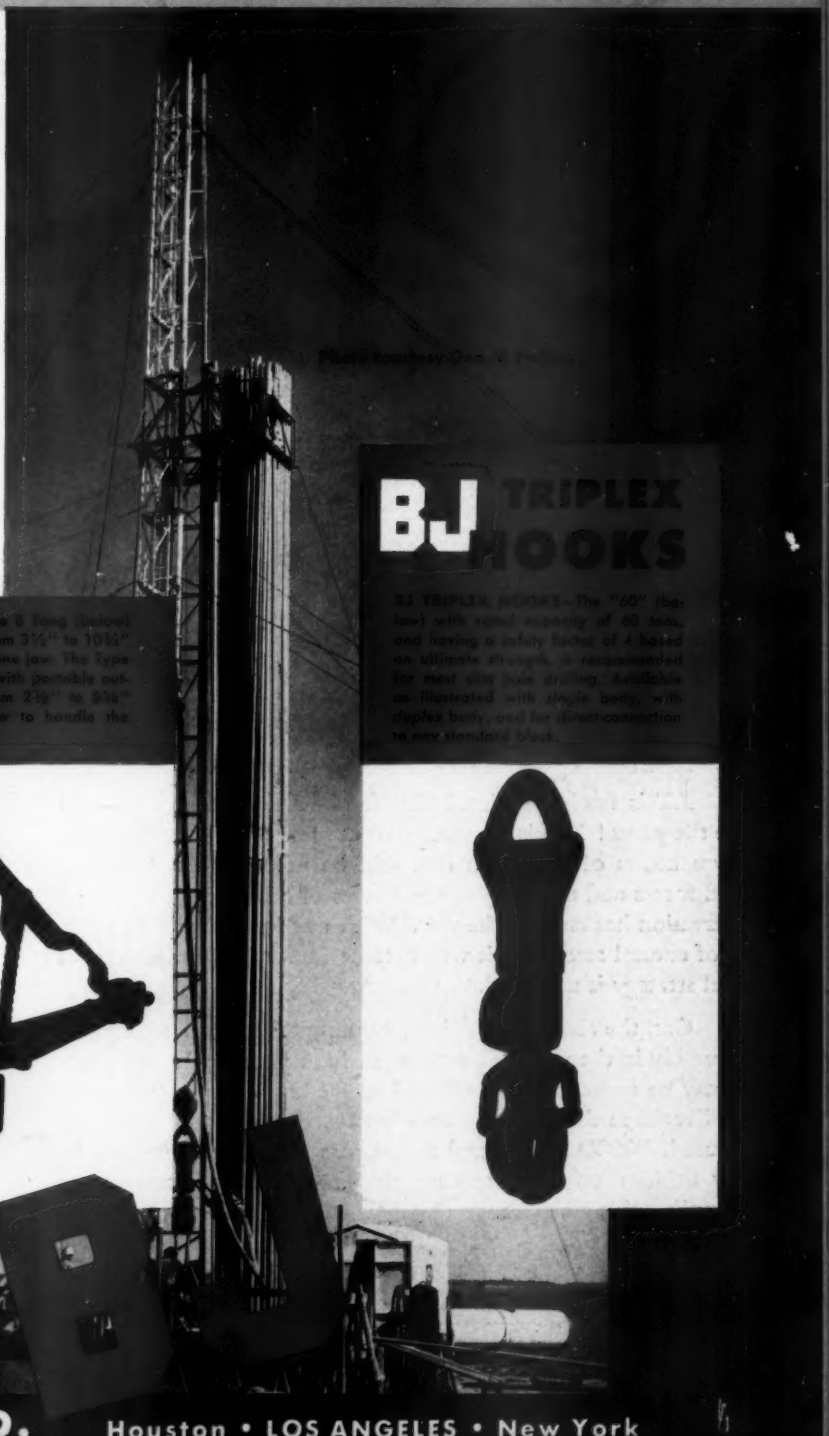

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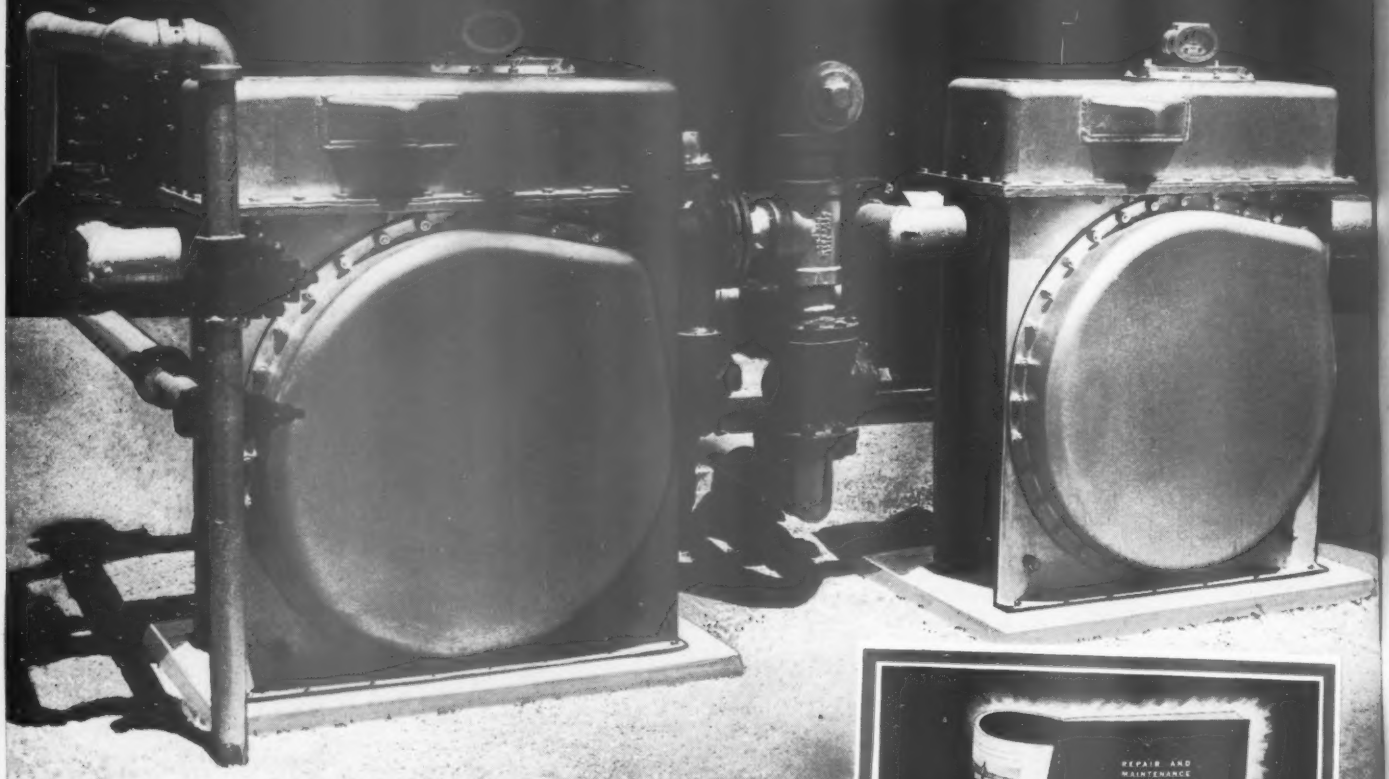

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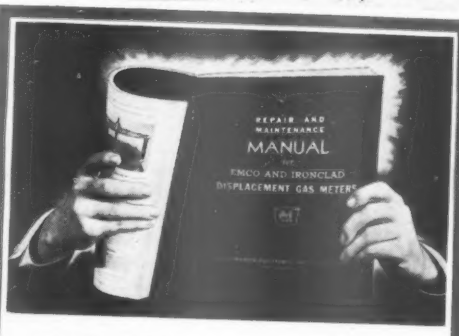

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the OIL AND GAS JOURNAL

published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE ST., TULSA, OKLAHOMA

Subscription price, United States and foreign, 1 year, $6.00; 2 years, $10.00; 3 years, $12.00; 5 years, $15.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879.

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Vol. 42, No. 24 October 21, 1943

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Many operators when setting liners, prefer to run the largest possible liner down through the water string and in such a practice the matter of clearance becomes an important factor. To insure getting the liner to bottom safely without sticking, it has become standard practice in many fields to enlarge the hole from casing shoe to bottom with a Baker Wall Scraper.

Details of such an application are given below.

Hole Scraped from Casing Shoe to Bottom to Provide Clearance for Liner or Casing
Original Hole
Additional Enlargement to Provide for Cement Anchor Around Shoe of Casing or Liner

In the particular well illustrated at left, 8⅝" O.D. casing was set with 7⅞" drilled hole below the shoe. It was desired to run a 6⅝" O.D. threaded and coupled liner. The O.D. of the coupling on the liner being 7⅜" was a little close for comfort to run in a 7⅞" hole. Accordingly, the hole was enlarged from casing shoe to bottom (1000 ft.) with a Baker Wall Scraper. The liner was run to bottom safely without danger of sticking.

For details concerning construction and operation of the Baker Wall Scraper, see pages 279-287 of the 1942 Baker, or Composite, Catalog. Also send for Baker Broadcast No. 19, a 40-page illustrated treatise covering Baker Wall Scraper applications.

Product No. 500
Baker Rotary Wall Scraper

IMPORTANT APPLICATIONS

Enlarging Hole to Provide Clearance for Liners
Scraping Face of Producing Zone
Setting Cement Plugs
Water Shut-Off Tests
Straightening Holes
Enlarging Holes for Gravel Packing
Side Wall Sampling
(By converting Scraper into Baker Wall Sampler)

Service Note

Competent Baker men will service, make suggestions, and otherwise assist in securing best possible results.

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Trends

Crude-Oil Production
By States—Page 107

CRUDE-OIL STOCKS 233,471,000 bbl. as of Oct. 9—down 1,172,000 bbl. One year ago 239,165,000.

GASOLINE STOCKS 69,708,000 bbl. as of Oct. 9—down 420,000 bbl. One year ago 77,406,000 bbl.

RESIDUAL FUEL-OIL STOCK 66,585,000 bbl. as of Oct. 9—up 178,000. One year ago 78,838,000.

GAS OIL AND DISTILLATES* 41,304,000 bbl. as of Oct. 9—up 406,000 bbl. One year ago 46,161,000.

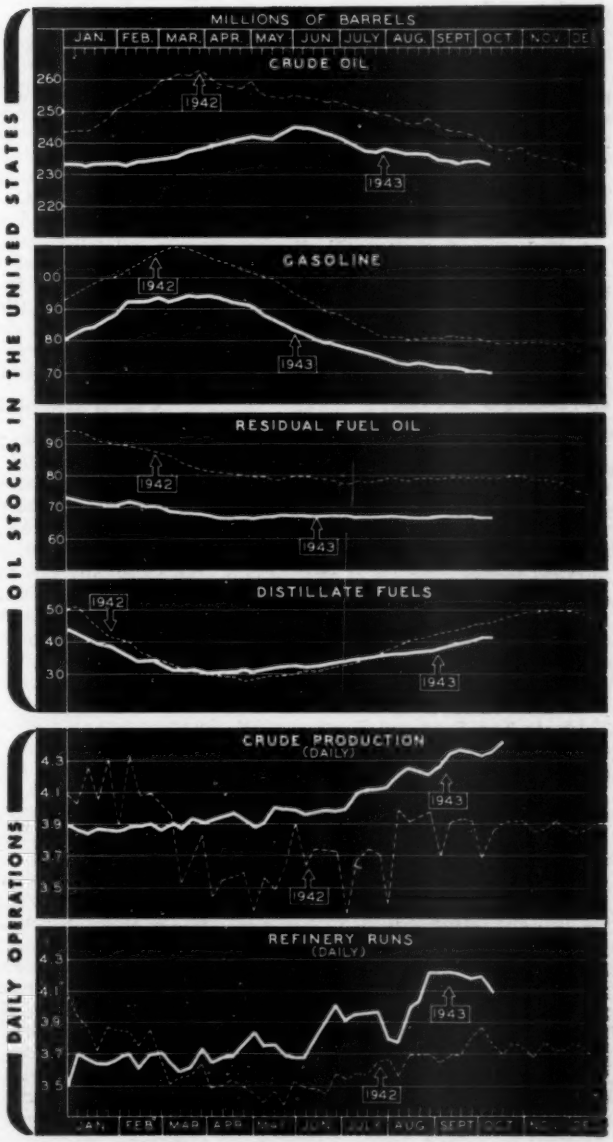
CRUDE PRODUCTION 4,438,035 bbl. daily average—up 48,065 bbl. One year ago 3,910,170.

REFINERY RUNS 4,094,000 bbl. daily week ended Oct. 9—down 65,000 bbl. One year ago 3,765,000.
*Last week revised to 40,898,000 bbl.

POSTWAR conditions as well as war needs are factors in the current discussions regarding development work that should be carried on in the Eastern Hemisphere during this period. In this connection economists are studying consumption conditions as well as production, refining, and transportation, several phases of which, centering in the Middle East, are discussed in special article in this issue. In 1939, which witnessed the start of this war, the consumption of petroleum and related products in the Eastern Hemisphere totaled approximately 620 million barrels which was 30.5 per cent of the world total for that year. Of this 620-million-barrel total, 66 per cent was accounted for by Russia, United Kingdom, Germany, France, Japan and Italy which with the United States, are the major belligerents.

IN most postwar studies it is assumed that Russia will continue to absorb for a time at least most of its own petroleum supplies. For the remainder of the Eastern Hemisphere the 1939 demands totaled 440 million barrels and the petroleum supplies including the related products were 220 million barrels. Thus in a normal year the Eastern Hemisphere outside Russia produced 50 per cent of its petroleum requirements. The postwar requirements in that part of the world will depend on several factors which cannot be determined at this time but the projections now being made generally assume that the immediate postwar requirements will be less than those of 1939 and then expand rapidly.

IN regard to supplies little is known with respect to the present Axis output and that of Russia. It is pointed out that Germany has leaned heavily on synthetic products which are costly and which presumably could not be justified in the postwar economy. The new production that has been found in the Persian Gulf area is generally credited with representing major reserves which could offset a large part of the petroleum deficit of the entire Eastern Hemisphere. In 1939 and earlier the most important countries of the Eastern Hemisphere looked to the oil output fronting on the Caribbean Sea for their supplementary supplies. This was particularly true of the United Kingdom, Germany, the Low Countries, and Italy. Thus the proposals to increase the Middle East production to aid the war effort has direct postwar significance to Venezuela, Colombia and other Western Hemisphere countries with exportable supplies.



Suspicion Over Objectives of PRC May Force Disclosure of Foreign-Oil Policy

by Henry D. Ralph

This roundup of the week's developments in the foreign petroleum picture indicates the scope and importance of negotiations now under way or pending between Petroleum Reserve Corp., and various interests controlling oil properties abroad.

WASHINGTON, D. C. — Intriguing developments in international-petroleum affairs threatened this week to force a more specific disclosure of policies by Petroleum Reserve Corp., the will-o'-the-wisp subsidiary of Reconstruction Finance Corp. Dissension spread through the industry as major companies and independents alike grew more suspicious of PRC.

These tangible developments occurred:

1. Petroleum Administrator Ickes, president of PRC, confirmed last week's report that a technical commission is now studying producing, refining and transportation facilities in the Near East and will soon leave for a first-hand survey of conditions there.

2. E. Holley Poe, formerly director of the Natural Gas and Natural Gasoline Division, Petroleum Administration for War, and previously secretary of the Natural Gas Section, American Gas Association, has been appointed executive officer and general manager of PRC.

3. W. A. Moncrief and Charles F. Roeser, Fort Worth, Tex., independent producers and members of a contingent now in Washington, D. C., representing the Independent Petroleum Association of America, charged that PRC's policy of secrecy was inimical to the interests of individual operators.

4. A new refinery of 150,000 bbl. a day capacity is reported to be under consideration in the Persian Gulf area.

5. Another report is that a 24-in. products line from the Persian Gulf to the eastern end of the Mediterranean may be built.

6. PRC claimed to be seeking 50 per cent interest in California Arabian Standard Oil Co.'s concession in Saudi Arabia. PRC also reported interested in the concession in Iran and Iraq, held by Seaboard Oil Co. and associates.

There appears to be slight doubt that PRC is headed toward direct government participation in foreign petroleum affairs. Objectives in this transition from a friendly supporter of individual American initiative in foreign fields to a position as an operating partner or direct competitor are more obscure. However, speculation among certain observers concludes that direct government participation in foreign oil affairs will assure this country of a more secure position in the postwar era.

Petroleum Administrator Ickes declined this week to amplify an earlier statement on PRC, saying that the corporation's activities are so closely identified with basic aspects of military strategy that they cannot be disclosed publicly in detail.

"But the fact that we have not talked," Mr. Ickes declared, "does not mean that we have not acted. Substantial progress has been made.

Solid Groundwork Laid

"Preliminary studies have been completed and solid groundwork laid for more comprehensive action looking toward an increasingly efficient utilization of foreign petroleum facilities for the fighting forces abroad and closer integration of foreign production and distribution into our domestic supply pattern.

"It is now necessary," he continued, "to undertake studies in the field to perfect our information from first-hand surveys and observations. The corporation, whose directors are the secretaries of state, war, navy, interior and the director of the Office of Economic Warfare, made arrangements several weeks ago to send a mission to the Middle and Near East oil fields.

"Among the technical experts on this important assignment will be E. DeGolyer, a consultant to the corporation and former assistant deputy petroleum administrator and one of the world's outstanding petroleum geologists, and W. E. Wrather, director of the Geological Survey, Department of the Interior.

"The mission will leave as soon as final arrangements can be completed and I hope to be able to announce the names of the other members shortly," Mr. Ickes said.

Rumors continue to circulate in oil circles about activities and plans to the general effect that PRC insists that this government corporation take an active part in foreign oil operations of American companies, including a share in or outright purchase of concessions and facilities of postwar value rather than simply loaning funds or conducting activities which are purely adjuncts to military operations. It is understood that some United States independent producers view this as a plot by major companies to insure themselves of supplies of cheap foreign oil to the detriment of domestic producers. On the other hand, the majors with foreign operations are said to fear that PRC may make an effort to squeeze them out of the foreign field and make all foreign oil operations a government monopoly.

However, close observers of the administration's foreign policy and of PRC personnel believe that both these fears are greatly exaggerated, reasoning somewhat as follows: It is no secret that the United States is approaching the limit of its ability to supply allied petroleum needs and that prolonged war will require development of oil resources elsewhere. After the war we may or may not be dependent on imports but if so the Government would certainly have an interest in seeing that United States refiners had an adequate supply at reasonable prices. The administration intends for this country to pursue an active diplomatic and economic participation in world affairs after the war, and this would logically apply also to foreign oil developments. Prior to this war, British and Dutch oil interests worked closely with their governments, including government ownership participation in some projects, with good diplomatic and business results. American oil companies might find such an arrangement necessary in postwar world competition. With active U. S. Government participation in foreign oil ventures American companies might be able to get better terms and concessions abroad, and foreign governments might be more hesitant to expropriate or cancel concessions. Also future administrations would be

less likely to countenance foreign expropriations if the Government had a financial interest in the deal. The area from the Persian Gulf northward is believed to be the world's richest oil reserves, and its development and use may well be a subject industry, a situation requiring the closest cooperation or partnership of government and industry.

The president of PRC is Mr. Ickes, who has frequently declared that he opposes the Government's taking over the oil industry.

There is no confirmation of rumors that PRC is making a deal with the British owned Anglo-Iranian Oil Co. to drill 20 wildcats in its 100,000-sq. mile concession, nor that California Arabian Standard Oil Co. asked PRC to loan $110,000,000 to finance additional production and refining facilities in its Persian Gulf and Saudi Arabian holdings which the government wants done but was told it must sell PRC a share in the operation. However, it is an open secret that the Government is recently very active in seeking development of additional oil in the Near East and elsewhere and is holding discussions with officials of American companies operating abroad.

The State Department has confirmed appointment of Col. John H. Leavell of Tulsa as petroleum attache for the Near East with headquarters in Bagdad. California Arabian has been advertising in San Francisco for men to work abroad.

Lack of Refineries Hampers Greater Use of Foreign Oil

by J. P. O'Donnell

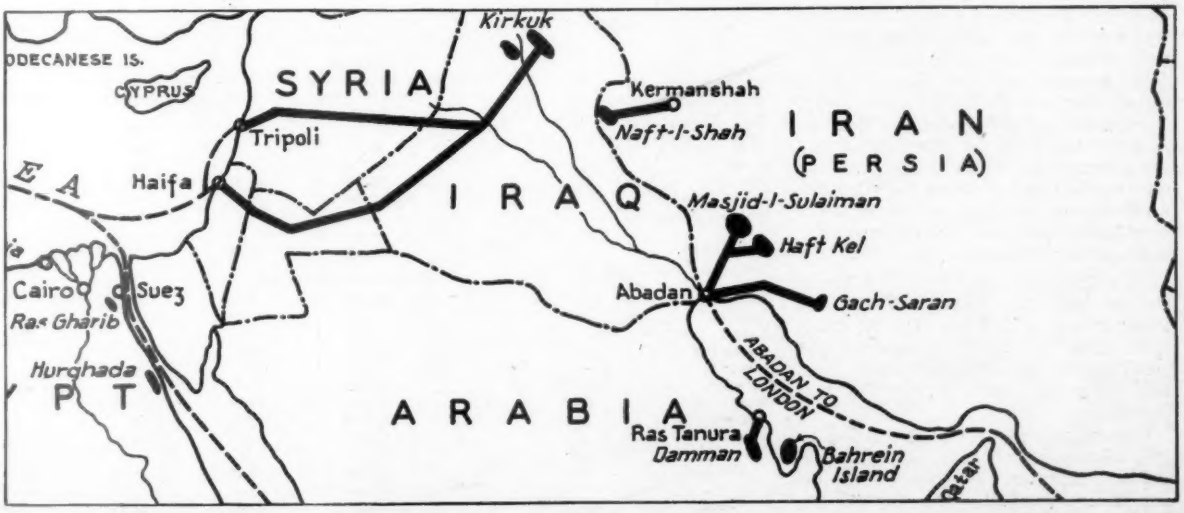
NEW YORK. — While the need for utilizing other sources of oil than the United States to fuel the war machine of the United Nations is now widely recognized, this does not mean that steps will or can be taken that will result in an immediate appreciable lessening of the drain on United States resources. One important reason for this is that the bulk of the refining capacity of the world, particularly that part capable of producing war products, is located in the United States.

In his book, "Fightin' Oil," Petroleum Administrator Harold L. Ickes states that "today we are producing the major part of the world's aviation gasoline" and adds, parenthetically, that the United States share "may even run as righ as 95 per cent of it." Obviously, then, in order to utilize foreign crude oil to a large extent, it will be necessary either to bring it to this country for refining and reexport or it will be necessary to erect refining capacity abroad that will be capable of producing war products. The most economic method in the long run would appear to be the erection of new refineries or the modernization and enlargement of existing plants close to those areas of crude production which are expected to relieve the United States.

Recent charges by senators who toured the war fronts that Near Eastern oil, dominated by British interests, has not been utilized as fully as possible, focuses attention on that area. Before the war, commercial production in the Persian Gulf area was limited to the Iranian fields operated by Anglo-Iranian Oil Co., Ltd., Bahrein Island, operated by Bahrein Petroleum Co., and a then small Saudi Arabian field, opened a short time before the war by California Arabian Standard Oil Co.

Iranian crude was refined at Abadan, where Anglo-Iranian has one of the largest refineries in the world. Its prewar capacity was rated at 300,000 bbl. daily of crude oil with a thermal-cracking capacity of 100,000 bbl. a day. This refinery was equipped then with a hydrogenation unit and a polymerization plant, qualifying it to produce aviation gasoline. Prewar capacity of the refinery on Bahrein Island was 32,500 bbl. daily and it had cracking facilities for 12,000 bbl. a day. California Arabian had a small 3,000 bbl. per day refinery at Ras Tanura, west of Bahrein Island on the Arabian mainland.

With a refinery the size of that at Abadan already available to serve the Iranian fields which are connected to it by pipe lines, construction of new refining capacity in the Persian Gulf area would logically be undertaken on the western shores of the gulf where processing facilities, as the above figures show, were considerably smaller. Actual or potential production has been developed in Kuwait, a small kingdom between Iraq and Arabia, at Damman in Saudi Arabia opposite Bahrein Island and on the Qatar Peninsula. To serve



The Near East petroleum area where PRC is planning a detailed study of possibilities for increasing United Nations' oil supplies

these producing areas, common refining facilities to be most convenient would be located near the existing Ras Tanura refinery which was installed to process Damman crude and which is centrally located between Kuwait and Qatar.

In order to be as economic as possible, such a refinery would necessarily follow the pattern of other foreign refineries and therefore would have substantial capacity, probably not less than 100,000 bbl. daily. It would be equipped with the most modern processing facilities to supply war and postwar demands. Fuel now occupies a large part of the carrying capacity of planes, particularly on long flights, so that air lines between Europe and the Far East in postwar years will need more frequent fueling points so that they may carry larger pay loads. For this reason aviation-gasoline capacity would be an essential part of new refining facilities in the Near East. This would mean not only the installation of fundamental crude distillation and thermal-cracking units but also substantial catalytic-cracking capacity for aviation gasoline base stock with isomerization and alkylation facilities for the production of essential blending agents.

Location of a western Persian Gulf refinery in or near Ras Tanura would entail the construction of pipe lines from Kuwait and Qatar. A line from the former would be approximately 300 miles in length and the latter would probably be in the neighborhood of 150 miles long since it would likely pass around the bay separating the Qatar Peninsula from the mainland.

The isolated location of the Persian Gulf with respect to principal centers of consumption plus its tremendous potential make it, in prospect, the world's greatest oil-exporting point. Large numbers of tankers would be required to distribute products to the world's main consuming areas because of the great distances involved. By way of the Mediterranean and Suez Canal, London is 6,555 miles from Abadan and New York is 8,450 miles. Sydney is 7,365 miles away. Comparison of the distances between Abadan and London by way of the Mediterranean, 6,555 miles, and by way of the Cape of Good Hope, 11,290 miles, shows the great saving in tanker mileage that has resulted from the opening of the inland sea.

An interesting possibility that would reduce both the time and cost of transporting oil from the Persian Gulf area to Europe would be the construction of a trans-Arabian pipe line from the gulf to the Mediterranean.

One of the features contributing to the advantage of pipe lines is the shorter distance between shipping and delivery points. The Texas-New York line is 1,388 miles long and compares with a tanker distance of 2,200 statute miles from Gulf ports to New York. In this instance the pipe-line route is 37 per cent shorter than the tanker route. In the case of a trans-Arabian line, the saving in distance would be even greater. An air-line route from Ras Tanura to the eastern Mediterranean, which a pipe line in that area could follow closely, would be approximately 1,050 miles long. This would compare with the tanker distance through the Gulf, the Indian Ocean, the Red Sea and the Suez Canal of an estimated 3,700 statute miles. Thus, the pipe-line route would be 70 per cent shorter. A direct pipeline route to the Mediterranean from Abadan would be less than 850 miles which would give it a still greater advantage over tankers. An incidental factor is that tankers must pay a toll when passing through the canal, thus contributing further to their cost of operation on this route.

A pipe line across Arabia could terminate at the established port of Haifa in Palestine. This is the present terminus of the Iraq Pipe Line Co. line from Kirkuk and the site of the Consolidated Refineries, Ltd., refinery. In this event, the trans-Arabian line would parallel the last section of the Iraq line through Trans-Jordan and pass between the Sea of Galilee and the Red Sea into Palestine. Haifa is already equipped with marine loading facilities which probably could be expanded to accommodate additional traffic.

Discussion of Allied Oil Supplies Expected to Continue All Winter

WASHINGTON, D. C.—Congressional discussion of the relative burden of the United States in supplying the petroleum needs of the Allies probably will be continued throughout the winter in connection with a general study of lend-lease operations scheduled to be made by investigating committees.

Without commenting on the suggestions that British interests might supply a larger share of the Allied oil needs, the Petroleum Administration for War made available figures on estimated present crude production in all parts of the world accessible to the United Nations, and the percentage of this production controlled by American, British, and other operating enterprises.

One interesting feature of these statistics is the revelation that production in the United Kingdom, a recent and little publicized development, is now 2,700 bbl. a day.

The PAW estimate shows that the total crude available to Allies outside this country is only about 1¼ million barrels per day, which is only about one-fourth the production in the United States, the inference being that this country must continue to supply the major share of requirements.

The table also shows that American interests control 47 per cent of these foreign oil sources, and British interests control 38 per cent.

HOW FOREIGN OIL SUPPLIES ARE HELD

	Estimated present production (bbl. per day)	Per cent control U.S.A.	British	Others
Eastern Hemisphere				
Bahrein	20,000	100	....	....
Egypt	25,000	....	100	....
India	7,000	....	100	....
Iran	200,000	....	100	....
Iraq	75,000	23.75	52.50	23.75
Saudi Arabia	15,000	100	....	....
United Kingdom	2,700	....	100	....
Total	345,200	15.30	79.54	5.20
Western Hemisphere				
Argentina	68,000	7.50	21.50	71.00
Bolivia	800	....	....	100
Brazil	220	....	....	100
Colombia	60,000	85	15	....
Ecuador	7,500	....	100	....
Mexico	110,000	....	....	100
Peru	40,000	70.50	29.50	....
Venezuela	585,000	80	20	....
Trinidad	60,000	....	100	....
Total	931,520	59.30	23.60	17.10
Grand total	1,276,720	47.39	38.73	13.88

THIS WEEK

PRODUCTION—PAW calls for production of 4,640,700 bbl. daily of all petroleum products in November, up 2,000 bbl. from the October quota. . . . Texas raised 5,000 bbl. . . . Declines in Districts 1 and 2 offset by raises in California and Texas. . . . ¶King County, Texas, wildcat discovery gages 30 bbl. an hour. . . . West Texas operators prepare for busiest year in history. . . . ¶Preliminary indications are that Permian basin operations will increase around 40 per cent in 1944. . . .

REFINING—War Department modifies its absolute restriction on aviation-gasoline plant information. . . . Several companies respond, showing current completion rate of plants at peak level. . . . ¶Plant operators ordering materials necessary for conditioning plants to handle larger quantities of sulfur-bearing oil. . . .

PRICES—Political pressure for higher crude-oil ceiling growing stronger. . . . Fred Vinson remains mum while congressmen clamor for decision. . . .

FOREIGN—Speculation runs rampant on objectives of Petroleum Reserve Corp. . . . Independents and majors, alike, are skeptical, chiefly because of secrecy. . . . Administrator Ickes says intimate relation to basic military strategy prevents further public disclosures. . . . Reports, neither confirmed nor denied, credit PRC with negotiations for drilling 20 wells on Anglo-Iranian concession, for half interest in California Arabian Standard Oil Co. properties, for a pipe line from Persian Gulf to Mediterranean, and for new refinery on Arabian mainland. . . .

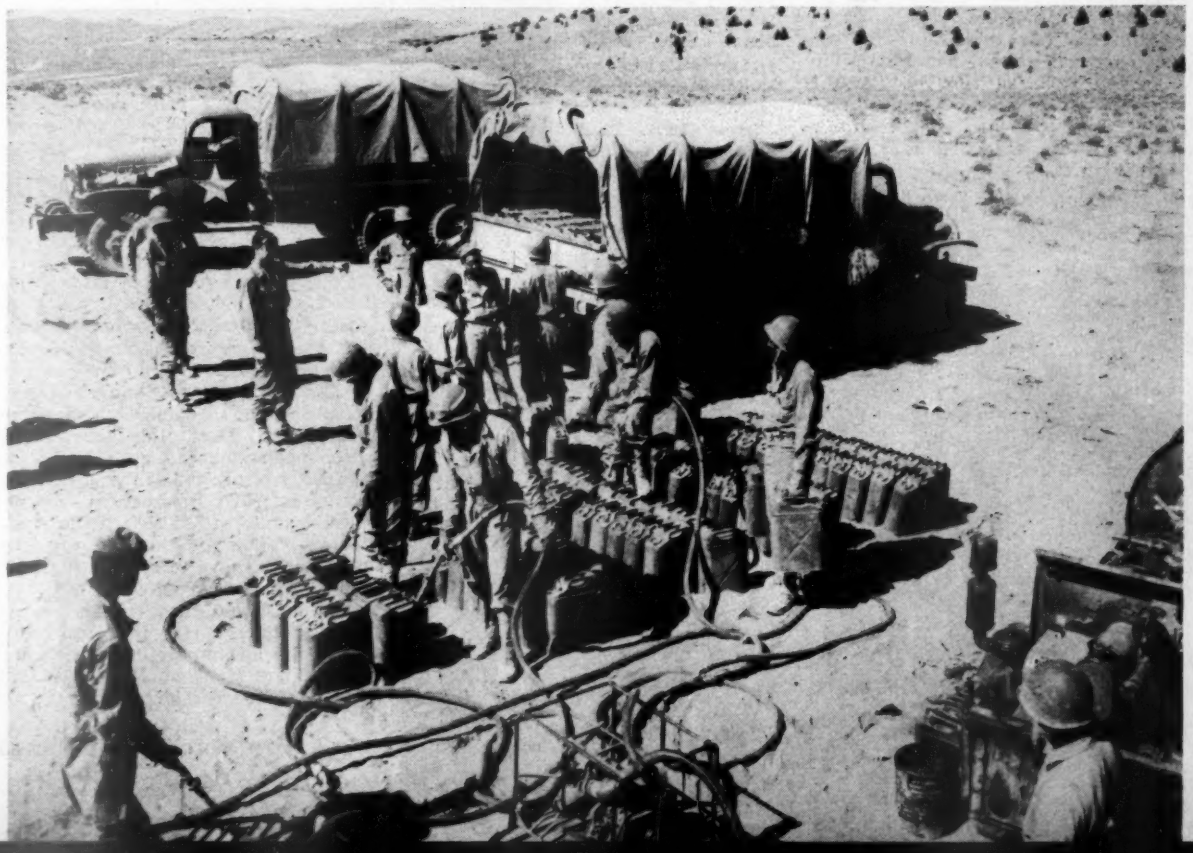
TRANSPORTATION—Movement of products through 20-in. line, from Gulf Coast to Norris City, Ill., scheduled to start next week. . . . ¶Repairs completed on Phoenixville, Pa.-Linden, N. J., leg of WEP crude-oil system. . . . Line carried 100,000 bbl. daily last week. . . . Current capacity for 150,000 bbl. expected to be reached soon. . . . Throughput to Linden will rise to 170,000 out of November schedule for 300,000 bbl. via trunk system. . . . Remaining 130,000 bbl. will move to Philadelphia and Marcus Hook. . . . ¶Atlantic Refining Co.'s 70-car loading rack at Midland, Tex., progressing, will be in service soon. . . . .

EQUIPMENT—Better quality steel to be available soon for drilling equipment, District 2 production committee advised. . . . ¶Supply companies see slightly easier situation ahead, possibly a reflection of growing familiarity with routine regulations. . . .

RUBBER—President Roosevelt comes out against protective tariff after the war for $750,000,000 synthetic-rubber industry. . . . Some authorities assert protection will be unnecessary, that synthetic will find its place in commerce without special assistance. . . . Administration's attitude, however, explains why private capital was unwilling to venture into synthetic industry without greater assurance of life after the war. . . .

An Army unit which handles 7,000 to 12,000 gal. of gasoline daily in the maneuvers of the Fourth Army Corps. Gasoline consumption for 9 weeks of training of this one unit is expected to be about 7,000,000 gal., explaining that much of the high military requirements is remote from the battle zones

Acme Photo



Industry's Assertions of Shortages Are Questioned

by H. Stanley Norman

FORT WORTH, Tex. — The conviction was deep among oil men here last week for the annual meeting of the Texas Mid-Continent Oil and Gas Association that the industry has done an inconclusive job in acquainting the public with the critical position of supplies.

Remarks of Gov. Coke R. Stevenson of Texas, who said he was unconvinced that the industry's reserves were deficient, were the basis on which oil men concluded that a weak case has been presented on declining producibility, depreciated reserves, and discouraging rates of discovery. Surely, they reasoned, if the chief executive of the country's largest oil-producing state was skeptical of the industry's assertions, how could the average layman understand the complex economics involved.

Tactics of the industry were inferentially indicted by Governor Stevenson, who told the oil men to "put your cards on the table and give a clear picture of the situation." He said he thought the public would respond to the industry's problems whatever they may be, if given the full truth.

"I'm not convinced, not yet," the governor continued, "that there is any shortage of oil or reserves that this country will require in the future. I don't think that it is necessary to build up the alarming shortage to justify an increase in the price of oil. If the costs have increased to warrant it, the public will support your endeavor."

A particularly strong plea for retention of the depletion allowance was made by George Sawtelle, president of the Kirby Petroleum Co., Houston, Tex., and retiring president of the association. He sketched a hypothetical earning statement for the Shangri-La Oil Co. which has built up production of 1,000 bbl. daily.

"This company," said Mr. Sawtelle, "has a small invested capital and wrote off intangible development costs during the base years for excess-profits tax purposes, so there is no average earning credit. The company is at the top tax-rate bracket. In 1943 the properties are fully developed, no drilling is done, so there are no intangible writeoffs. If crude averages $1.25 per barrel, the gross income for 1943 will be $450,000. Lifting costs, including taxes, depreciation, and general overhead, will aggregate approximately $200,000, leaving a net income before income taxes of $250,000. By exercising the right to statutory depletion, the company pays $100,000 in income tax and has remaining a net income of $150,000. Now suppose we assume a 35-cent per barrel increase in the price of oil, but take away the statutory depletion allowance. Gross income is increased to $576,000 and expenses remain at $200,000, leaving a net profit of $376,000 before income taxes. Since no further depletion allowance is possible, the net income becomes the taxable net income. Being in the excess-profits tax bracket, Shangri-La now pays $300,000 in taxes on the same production. Thus, the net income, after income taxes, is not $150,000 but $76,000, irrespective of the 35-cent increase in price. In order to keep net income taxes at $150,000, if the statutory depletion is eliminated, the company would have to receive $2.64 per barrel, or an increase of $1.39."

The unsolved crude-oil and petroleum-products price problem establishes the incompatibility of economics and politics, declared John D. Gill,

(Continued on page 54)

Right: Burt E. Hull accepting the citation for outstanding service by a major company representative from Joe S. Bridwell, Wichita Falls, Tex., independent producer

Below: Harry C. Wiess, president of Humble Oil & Refining Co., Houston, Tex., handing the plaque to Maj. J. R. Parten, director of transportation for PAW, in recognition for outstanding service by an independent oil man. Inset: Maston Nixon, vice president and general manager of Southern Minerals Corp., Corpus Christi, Tex., elected president of the Texas Mid-Continent Oil and Gas Association

Imperial's Position in Canol Project Disclosed by Gallagher Statement

NEW YORK.—Details on the oil-production phase of the Canol (Canadian Oil) project in the Northwest Territory of Canada were disclosed here last week by Ralph W. Gallagher, president of the Standard Oil Co. (New Jersey). The current rate of production was not disclosed in the official release approved for publication by the Office of Censorship and the U. S. Army. However, it was revealed that the production rate of 3,000 bbl. daily as of January 1 this year has been increased materially by completion of additional wells.

Imperial Oil, Ltd., Canadian affiliate of Standard of New Jersey, will function for the war's duration as operating agent for the U. S. Government in producing oil from the Canol project. Imperial, Mr. Gallagher revealed, has the privilege of buying the equipment assigned to the oil-producing operations after the U. S. Government has no further use for it, the price to be agreed upon within 6 months after that time.

"New oil wells near Fort Norman, 100 miles from the Arctic Circle in the Canadian Northwest," Mr. Gallagher said here October 14, "are now ready to deliver large quantities of crude for the Alaskan war front at $1.25 a barrel. This compares with a price of crude in the United States ranging from $1 to more than $2 a barrel. Oil transported from the United States to Fort Norman would cost approximately $6 a barrel.

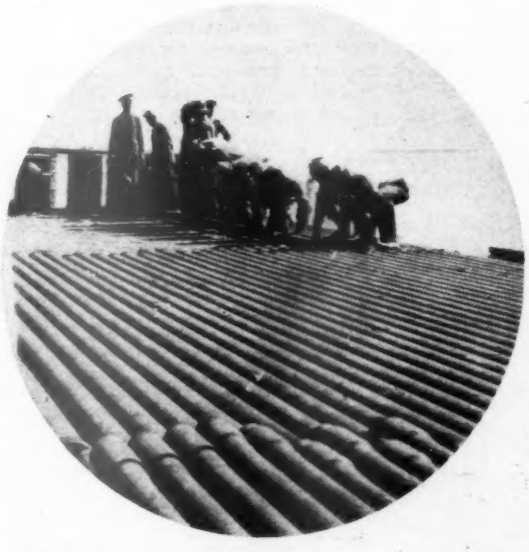
Acted on Army Request

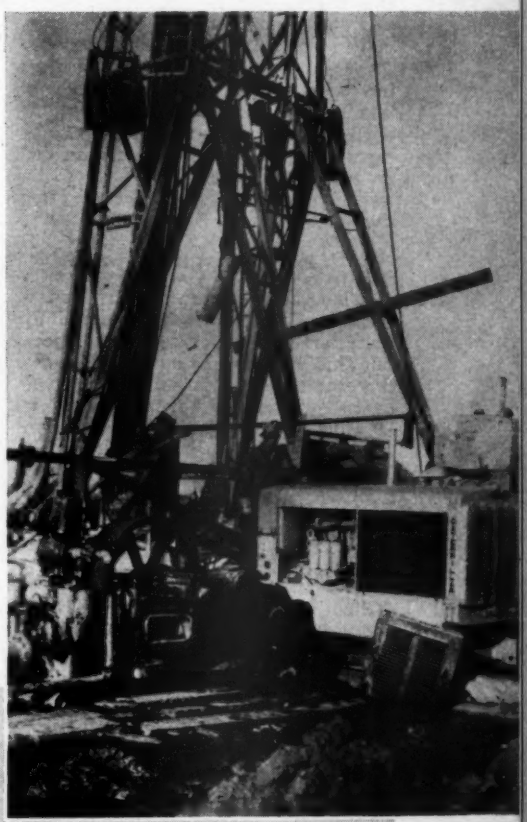
"Imperial Oil, Ltd., Canadian affiliate of Standard Oil Co. (New Jersey) drilled the wells at the request of the U. S. Army. The new wells will greatly increase production at Norman Wells, the only proved source of crude in quantity anywhere near Alaska.

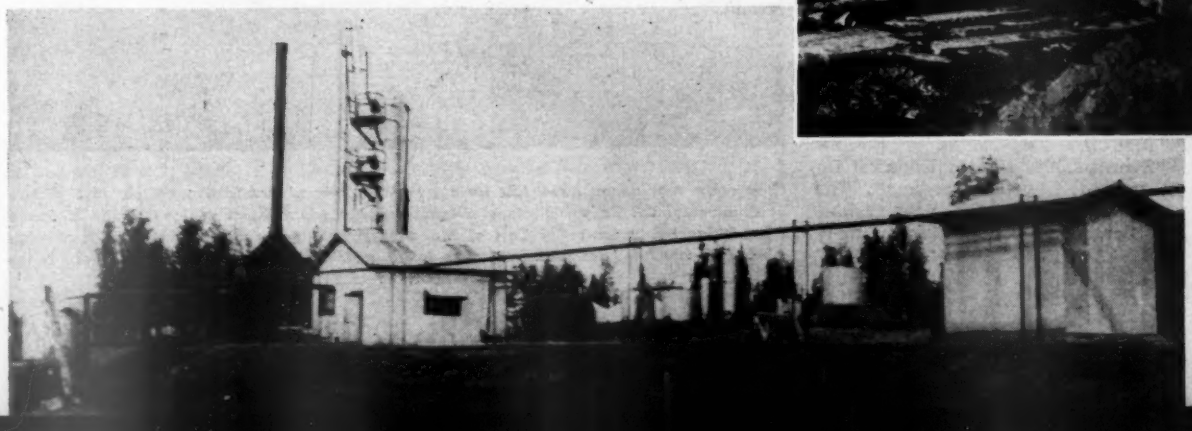
"By January 1943," Mr. Gallagher went on, "enough wells had been drilled to produce 3,000 bbl. daily. Additional wells have been drilled since that time and this capacity is being expanded still further to meet U. S. Army needs.

"This new source of oil avoids dependence on tankers to supply Alaskan military bases over water routes open to enemy attack.

"Development of Norman Wells is one unit of the vast Canol project being carried on in support of the Alaskan war theater. This project includes construction of roads, establishment of air bases, laying of an oil pipe line from Norman Wells to White Horse, and the erection of a refinery at the latter point. Imperial







Left: Negro troops, U. S. Engineers, unload the vital pipe which will carry oil to Whitehorse. Right: Two diesel engines driving the rig drilling for oil at Norman Wells. Diesels will also be used for pumping, and electric sets will provide power for lighting stations along the pipe line. Below: Imperial Oil, Ltd., refinery at Norman Wells

Oil has no part in any of these other activities, its sole assignment being development of the oil production.

"Expansion of the Norman Wells field was first suggested to Imperial by the U. S. Army in April 1942. Imperial was the only organization with oil-producing experience in that area, having operated in the Far North since 1919.

"When the Army 'go ahead' was given in May, Imperial began the difficult task of assembling in the face of wartime shortages all the necessary drilling equipment, of locating and organizing suitable personnel and getting both men and material to the railhead north of Edmonton in time for the Army to transport them to the production area before the 1,100-mile lake-and-river route to Norman Wells was closed by ice.

"Within 2 months, drilling of the first new well had begun and by January 1943, enough wells had been completed to assure fulfillment of the production goal originally set by the Army. For the first time in history, drilling operations continued throughout the Arctic winter, during which temperatures dropped as low as 70° below zero.

"Since additional oil production in this region had no peacetime outlet and there was, therefore, no commercial incentive for Imperial to expand the field, equipment for the project has been bought by the U. S. Army and belongs to the Government. Imperial has the right to buy the equipment after the U. S. Government has no further use for it, the price to be agreed upon within 6 months after that time.

U. S. Underwriting Expense

"The U. S. Government is underwriting direct expenses incurred by Imperial in developing the project, but this money is to be repaid to the Government through a reduction to 50 cents a barrel of the price of crude it buys. This reduction will begin after the Government has purchased 1,500,000 bbl. of oil at the regular price of $1.25 a barrel, and will continue until the Government has been reimbursed for all outlays to Imperial.

"The first well in that area was drilled in 1920. By 1924, six wells had been drilled, only three of which were producers. A small refinery had also been constructed.

"A local market for the oil began to develop in 1932, when rich mineral deposits at nearby Great Bear Lake began to be exploited. River traffic mounted. River boats required gasoline, and the mining machinery needed fuel oil.

"Even by 1941 the local market for oil from the wells was small. The price of gasoline at the refinery had, however, been reduced from more than $2 per gallon to about 30 cents per gallon.

"Today operations at Norman Wells are on a year-round basis. The Army has multiplied its original quotas of last year. In attempts to meet them, Imperial is carrying on exploratory work in areas adjacent to Norman Wells in a search for additional drilling sites on prospective oil structures located by Imperial geologists during the last 20 years.

"Drilling operations of the last year have disclosed that the Norman field is larger than originally believed, and is comparable in size to a major United States oil field, although not exceptional."

Continental's Aviation Plant Near Completion

Censorship restrictions on reporting progress of the aviation-gasoline program were liberalized somewhat this week. This story, another about dedication of Sun Oil Co.'s new plant (page 99) and others concerning the Root Refining Co. plant at El Dorado, Ark., and Standard Oil Co. of New Jersey's conversion project at Baltimore, Md., were authorized for publication.

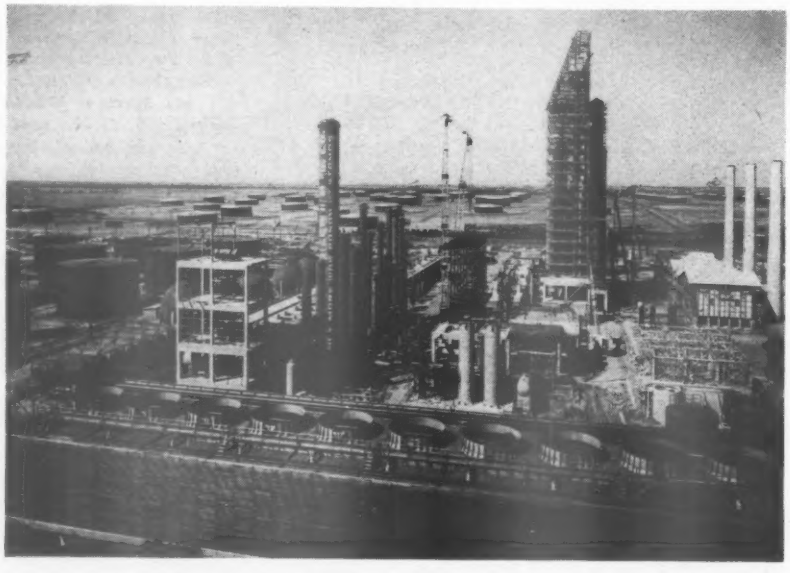
PONCA CITY, Okla.—Continental Oil Co.'s 100-octane plant, which has been designed to manufacture approximately 5,000 bbl. daily of high-test aviation gasoline, has been scheduled for completion by January 1, 1944, it was announced here by C. R. Loehrke, superintendent for the Lummus Co., contract builders of the plant. Cost of the project will approximate $12,000,000, he said.

Although construction work on the plant was started early in August 1942, no detailed information on the project has been permitted under censorship regulations until the release of such data was authorized recently by Robert P. Patterson, undersecretary of war.

A total of 974 employes of the Lummus Co. are now engaged in construction work, and the payroll for the past 3 months has averaged $47,550 each week. Construction work is expected to reach its peak about December 1, when approximately 1,300 men will be on the job. When the plant is completed the operating crew will comprise about 200 men.

The 100-octane plant includes a Thermofor catalytic cracking unit for the production of a base gasoline, and alkylation plant to produce isooctane. These two products will then be blended with tetraethyl lead and isopentane, a product of natural-gasoline plants, to produce the aviation gasoline.

Central unit is the T.C.C. plant, which towers 234 ft. above the surrounding terrain. There are four stacks 125 ft. high, and one stack 150 ft. high. The isopentane tower, which weighs 118 tons, is 11 ft. in diameter and 132 ft. high. The plant also includes a control laboratory, rail trackage for simultaneous loading of 30 tank cars, storage for 240,000 bbl. of finished products, and a redwood cooling tower for cooling 30,000 gal. of water per minute.



Censorship regulations have just been revised to permit publication of this first picture of Continental Oil Co.'s 100-octane aviation-gasoline plant which is being built at Ponca City, Okla., by Lummus Co. Cost of the project will approximate $12,000,000, and completion is scheduled for January 1. The tower in the center, standing 234 ft. high, is the Thermofor catalytic cracking unit

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Safeguarding the Future

PRESIDENT ROOSEVELT has served notice that it is the Government's intention to junk its 750-million-dollar synthetic-rubber investment when the emergency is over and to return to the prewar policy of importing natural rubber.

There are several obvious comments which are being made regarding this proposal. Presumably it is being announced now to quiet the fears of Allied countries anxious to regain this important rubber trade originating largely in the Far East in which countries of the Western Hemisphere are also hoping to participate after the war.

Conceding the merits of postwar planning which seeks to bring about a generally higher standard of living through a freer exchange of world goods and thus also establish a base for a more lasting peace, there are matters of self-interest which can't be overlooked in this instance.

The loss of natural rubber supplies shortly after Pearl Harbor came close to winning a war for the enemy and it caused maladjustments in our war economy which are still with us. Had it not been for petroleum's scientists and managements who foresaw the dangers of a rubber shortage and who persisted in their efforts to establish the "know how" of synthetic production, despite the lack of governmental support, the Allies today would not be advancing on every front.

To ignore this lesson in plans for the future would be inexcusable and is unthinkable irrespective of any costs involved.

Regarding costs there is no basis for the information apparently given the President that the production of synthetic rubber will not be able to hold its own in postwar competition.

It would be well in this connection to study the ups and downs of natural-rubber prices over the past quarter century and the probable trends when those controlling the Far East supplies carry out their promise of ending the labor conditions from which the cheap rubber came. Divorced from subsidies the available information indicates that natural-rubber supplies being developed in this hemisphere will not be competitive in world markets

Actually no one knows at this time what the postwar costs of rubber substitutes will be. The petroleum and rubber industries are now completing in a little over a year a construction program which normally would have taken 10 or more years. A major industry was evolved overnight from laboratory and pilot-plant data. Under the pressure of government directions to get the job done quickly little attention has been paid to costs.

Builders and operators know that the war charges can be greatly reduced. Technologists are moving fast in this newest of manufacturing arts and there is every reason to believe that production costs, after a year or two of private operation, will bear little relation to the present figures.

The same situation applies to the utilization of the new products whose commercial characteristics are just beginning to be explored. Here again the weight of the evidence points to greatly increased wearing properties over a much wider field of application than was possible with natural rubber. This has direct bearing on consumer costs.

Rubber synthesis is an integral segment of a growing petro-chemical industry and of allied enterprises which are playing an essential part in winning a war. Given the opportunity it will make a greater contribution to a postwar world than will ever come from the juggling of obsolete markets.

"Oil Goes to War" Is Theme Of A.P.I. Convention

"OIL Goes to War" is the theme of the twenty-fourth annual meeting of the American Petroleum Institute, to be held November 8-11 in the Palmer House, Chicago. The part of petroleum in providing essential materials for the great war machine at home and on battle fronts will receive almost the entire attention of this second wartime convention, at which high Army, Navy and Coast Guard officers and executives of the Petroleum Administration for War, the War Production Board and other government agencies will join oil men in reporting on the role of oil in the war.

The program follows:

Tuesday, November 9

GROUP SESSION

10 a.m.

Protection of Petroleum Facilities

Wartime Facility Security. — Presiding: George A. Hill, Jr., Houston Oil Co. of Texas, Houston, Tex.

"Wartime Instruction and Training of Employes." L. S. Wescoat, chairman, PIWC Great Lakes region committee on protection of petroleum facilities, Chicago.

"Wartime Fire Protection." A. A. Jergins, Petroleum Administration for War, Washington, D. C.

"Wartime Protection of Petroleum Piers and Wharves." Capt. Norman B. Hall, U. S. Coast Guard, Washington, D. C.

"Coordinating Wartime Internal-Security Proragms." Col. George K. Engelhart, Provost Marshal General's Office, Washington, D. C.

GROUP SESSION

1:30 p.m.

Division of Refining

Wartime Cooperation. — Presiding: G. G. Oberfell, Phillips Petroleum Co., Bartlesville, Okla.

"Technological Team Work." T. G. Delbridge, chairman, PIWC technical advisory committee, Atlantic Refining Co., Philadelphia, Pa.

"Cracking-Coil Tubes at War—They Can Take It." P. J. Herrington, M. S. Northup, and C. O. Rhys, Sr., Standard Oil Development Co., Elizabeth, N. J.

"The Analytical Chemist on the Spot." Harry Levin, chairman, PIWC TAC subcommittee on analytical methods, Texas Co., Beacon, N. Y.

"The Activities of the Aviation-Gasoline Advisory Committee." H. G. Burks, Jr., chairman PAW aviation-gasoline advisory committee; Standard Oil Co. of New Jersey, New York.

"Oiling the War Machine." G. R. Lord, chairman PAW lubricating-oil advisory committee, Sinclair Refining Co., New York.

"The Coordinating Research Council." K. G. Mackenzie, chairman automotive research committee; Texas Co., New York.

GROUP SESSION

2 p.m.

Division of Production

Internal Corrosion of Gasoline Pipe Lines.—Presiding: A. H. Riney, Phillips Petroleum Co., Bartlesville, Okla.

"Suggested Formula for Calculating the Capacities of Products Lines." T. R. Aude, Stanolind Pipe Line Co., Tulsa.

Symposium on Combating Internal Corrosion of Gasoline Pipe Lines.

Note: If necessary, this session will continue Tuesday evening at 8 p.m., with W. F. Rogers, Gulf Oil Corp., Houston, Tex., presiding.

GROUP SESSION

2 p.m.

Division of Production

Criteria for Determining an Oil Field's Susceptibility to Secondary-Recovery Methods.—Presiding: Paul D. Torrey, consulting engineer, Houston, Tex.

Papers on the following subjects are now under consideration by the program committee. Speakers will be announced later:

Part 1: Schedule of Information Desirable for a Study of the Secondary-Recovery Possibilities of an Oil Field.

Part 2: Analysis of Field Information and Discussion of Criteria Determining the Probability of Success of Secondary-Recovery Operations.

GROUP SESSION

8 p.m.

Division of Production

Drilling and Production Practice. — Presiding: F. E. Heath, Sun Oil Co., Dallas, Tex.

Papers on the following subjects are now under consideration by the program committee. Speakers will be announced later:

Standardization of Electrical-Log Headings.

Relation of Permeability to Productivity Index.

Wednesday, November 10

GROUP SESSION

9 a.m.

Division of Production

Production and Pipe-Line Topics.

"Building the Big-Inch Pipe Line." Burt E. Hull, War Emergency Pipelines, Inc., Cincinnati, Ohio.

"Manpower—The Industry's No. 1 Problem." John M. Lovejoy, Seaboard Oil Co. of Delaware, New York.

GROUP SESSION

9:30 a.m.

Division of Refining

Research Reports and Catalytic Cracking.—Presiding: J. F. M. Taylor, Shell Oil Co., Inc., New York.

"Hydrocarbons in the Gasoline Fraction of Seven Representative Crudes, Including All the Distillates 40° to 102° C. and the Aromatics to 160° C." A. F. Forziati, C. B. Willingham, B. J. Mair, and F. D. Rossini, National Bureau of Standards, Washington, D. C.

"The Synthesis and Properties of Hydrocarbons of High Molecular Weight—III." R. W. Schiessler, D. G. Clarke, C. S. Rowland, W. S. Sloatman, and C. H. Herr, The Pennsylvania State College, State College, Pa.

"Houdry Adiabatic Process for the Conversion of Petroleum Hydrocarbons." Eugene J. Houdry, Houdry Process Corp., Wilmington, Del.

"Cracking With Catalysts." C. L. Thomas, N. K. Anderson, H. A. Becker, and J. McAfee, Universal Oil Products Co., Chicago.

10 a.m.

Board of Directors

Board of Councillors

To nominate candidates for election as members of the board of directors.

GENERAL SESSION

2 p.m.

Report of board of councillors and election of directors.

President's address: William R. Boyd, Jr., American Petroleum Institute; chairman Petroleum Industry War Council.

Address: Ralph K. Davies, deputy petroleum administrator for war, Washington, D. C.

Address: Warren H. Atherton, national commander, American Legion, Indianapolis, Ind.

Address: Col. Bradley Dewey, rubber director, War Production Board, Washington, D. C.

GENERAL SESSION

8 p.m.

Motion pictures.

"Oil for War." Film covering construction of the big-inch pipe line.

"Belvoir" Film. Oil executives go to war.

(These will be shown through the courtesy of the Barrett Division, Allied Chemical & Dye Corp., New York.)

Thursday, November 11

GROUP SESSION

9 a.m.

Division of Production

Drilling and Production Practice. — Presiding: T. H. Acres, Richfield Oil Corp., Los Angeles, Calif.

Papers on the following subjects are now under consideration by the program committee. Speakers will be announced later: Well-Completion Practices, Proper Counterbalancing, and Pressure Maintenance in Midway Field, Arkansas.

Report of division's nominating committee. George S. Bays, Stanolind Oil & Gas Co., Tulsa, chairman.

Election of 20 members of the general committee of the Division of Production.

GROUP SESSION

9:30 a.m.

Division of Refining

Catalytic Cracking.—Presiding: W. B. Ross, Pure Oil Co., Chicago.

"Gas-Oil Cracking by the Cycloversion Process." W. A. Schulze and C. J. Helmers, Phillips Petroleum Co., Bartlesville, Okla.

"Recent Developments in TCC Processing." T. P. Simpson, J. W. Payne, L. P. Evans, and C. V. Hornberg, Socony-Vacuum Oil Co., Inc., Paulsboro, N. J.

"New Houdry Static-Bed Developments." R. H. Newton and T. B. Pickett, Houdry Process Corp., Wilmington, Del.

"Fluid-Catalyst Cracking for Premium Fuels." E. V. Murphree, H. G. M. Fischer, E. J. Gohr, and W. J. Sweeney, Standard Oil Development Co., Elizabeth, N. J.; and C. L. Brown, Standard Oil Co. of Louisiana, Baton Rouge, La.

Report of division's nominating committee. J. T. McCoy Tide Water Associated Oil Co., Bayonne, N. J., chairman.

Election of 20 members of the general committee of the Division of Refining.

10 a.m.

EXECUTIVE COMMITTEE

Executive committee of board of directors.

GENERAL SESSION

2 p.m.

Address: Hon. Harold L. Ickes, secretary of the interior; petroleum administrator for war, Washington, D. C.

Three addresses by speakers to be announced.

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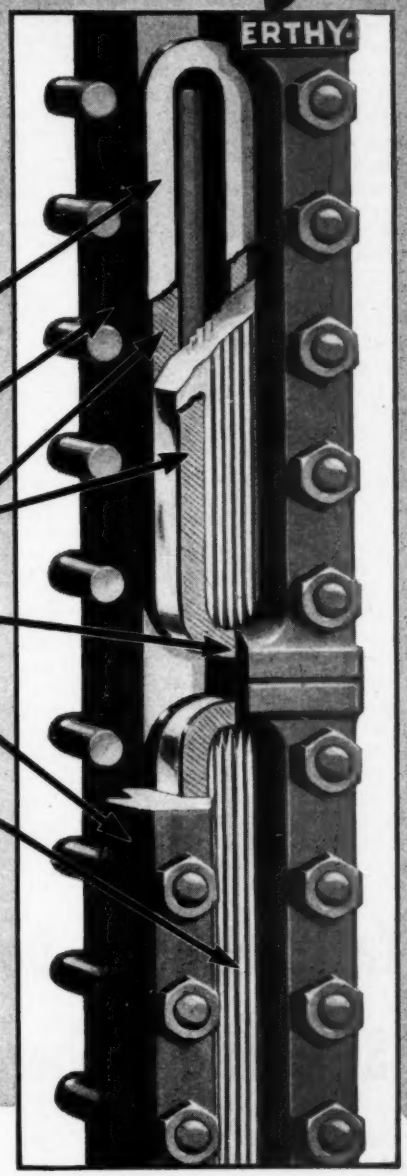

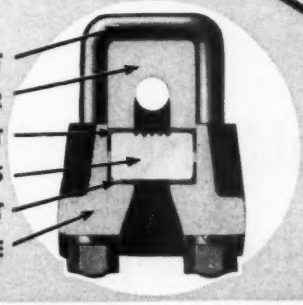

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Federal Order Digest

PAW Regulations

Butylenes—PAW Directive 75: Establishes control over separation and disposition of isobutane and butylenes, requiring use of these fractions exclusively in war products, issued October 19.

Naphtha—PAO 18:—Prohibits use of naphtha in operation of motor vehicles or boats and establishes quarterly delivery quotas for dealers and bulk consumers, issued October 19.

Fuel Oil—PDO 13, amended: Permits fuel-oil deliveries to newly installed home burners, if the new equipment replaces worn out or inefficient burners, issued October 14.

Service Stations—PAO 12, amended: Clarifies previous order, and specifically prohibits use of material in connection with service station or retail outlet for other than upkeep or restoration, issued October 14.

Prices and Rationing

Gasoline—RPS 88, Amendment 131: Reinstates 0.75 cent a gallon allowance which tank-wagon sellers of motor gasoline must make to certain bulk consumers in five Central Atlantic states and the District of Columbia, effective October 15.

Petroleum Retail — MPR 137, Amendment 37: Authorizes retailers to take nearest competitive seller's present price, instead of his March 1942 posting, effective October 20.

Heating Oil—RPS 88, Amendment 130: Establishes specific maximum tank-wagon prices for range oil, stove oil and heater oil at the bulk plant points of St. Louis, Mo., and East St. Louis, Ill., at 8.9 cents per gallon for less than 25 gal., 8.3 cents for 25 to 99 gal., and 7.9 cents for 100 gal. and over, effective October 20.

Tires—RO 1A, Amendment 57: Adopts recent WPB Rubber Order R-1 restrictions on tire dealers' inventories, to distribute stocks to areas in direst need, effective October 19.

Appointment—Col. Bryan Houston, as deputy administrator for rationing.

WPB Regulations

Gum Inhibitors—AO M-354: Places four gum inhibitors, DuPont 5, DuPont 6, U.O.P. 4 and U.O.P. 5, under allocation, because of increased use for military gasoline and resultant tight supply, effective November 1.

Fuel Oil—LO L-56: Revoked, effective October 15. Points now covered by PDO 13.

Tires—RO R-1, Amendment 5: Divides control over dealer inventories between WPB and the Office of Rubber Director, effective October 11.

Manpower Orders

Drillers Wages—National Labor Relations Board accepts "approvable rates" for five oil-well drilling classifications as recommended by Eighth Regional Labor Board. Uniform wage rates now apply to 27 states in Middle West and Southwest.

Transfer of Workers—Provides for transfer of workers to war jobs and to keep essential workers where they are, effective October 5.

Tariff Support Doubtful for Synthetic-Rubber Industry

WASHINGTON, D. C.—Fears of the oil industry that private expenditure of large sums for emergency synthetic-rubber plants might become a liability after the war appeared here this week to have been entirely justified.

President Rosevelt last week declared that synthetic-rubber production in the United States should not be protected after the war by a tariff on natural rubber. Thus, he practically wrote off the $750,000,000 synthetic-rubber industry as a peacetime competitor with natural rubber, unless production and manufacturing costs can be reduced substantially as some technicians believe is possible.

Lack of assurance during the early phases of the war that manufacturers could rely on Government support to recover costs of synthetic-rubber plants in the postwar era was the chief factor in delaying construction. Reticence of oil companies to spend three-quarters of a billion dollars on facilities whose value after the war was so conjectural has been criticized by Vice President Wallace and other high executives of the administration.

Mr. Roosevelt mentioned this prospect at a press conference at which he also announced that the Office of War Mobilization, headed by James F. Byrnes, is going to have a unit to study problems of reconversion and disposition of war plants and property.

"The work has deliberately been placed within the Office of War Mobilization," the statement continued, "to ensure that such reshaping of our war program as may be required will be carried through with a view to increasing the effectiveness of our war effort. While we must prepare for necessary postwar adjustments, this preparation must not interfere with the long and hard war programs which are still ahead of us."

The president brought up the subject of rubber while relating that he gave a stag dinner last week for President Lescot of Haiti who is here on a visit.

Later, the White House made public remarks by Mr. Roosevelt and President Lescot in toasting each other at the dinner. At one point Mr. Roosevelt was quoted as saying:

"I hope that when I am out of the White House—I might get beaten on it otherwise—that the congress won't put the kind of tariff on rubber for American automobile tires just to keep some synthetic-rubber plants going. That would mean that every man in the United States who owned a car would have to pay 50 per cent more for his rubber. I believe in cheap tires, and more of them; and the only way to get that is to use the tires that are made by nature, whether it be rubber, guayule or cryptostegia."

Col. Bradley Dewey, the rubber administrator, has expressed belief that synthetic rubber should compete, without tariffs or subsidies, with natural rubber after the war. He also has said a substantial part of the synthetic industry can be used after the war, and that synthetic rubber is better than natural rubber for some purposes.

Another view expressed by Colonel Dewey is that existence of the American synthetic-rubber industry should stabilize prices for crude rubber and, by holding down the price, contribute to expanded use of rubber for flooring and in other fields where it was not of prewar importance.

Barnsdall Oil Co. Enters Rocky Mountain Area

Joining the growing list of Mid-Continent operators entering the Rocky Mountain district, Barnsdall Oil Co. has as representatives in that area George Robertson, landman, with headquarters at Denver, and D. G. Shea, geologist, at Billings, Mont.

Reports that Barnsdall had acquired a half interest in properties of Husky Refining Corp. at Oregon Basin, Maverick Springs and on the Shoshone anticline in Wyoming were not confirmed, although negotiations between the two companies have been conducted for some time.

Headquarters—Fort Worth

Industry's Assertions of Shortages Questioned

(Continued from page 46)

a director of the Atlantic Refining Co., and chairman of the Petroleum Industry War Council subcommittee on cost and price adjustment.

"If all of our country's economic problems were to be handled by the Government the way the crude-price problem has been handled," Mr. Gill asserted, "the economic progress of the country would slow down to a state of putrid stagnation."

He traced the history of the effort to obtain approval for an advance in petroleum prices and asserted that the Government has failed to serve the master called "supply" and has chosen to serve its magnificent obsession called "hold the line."

"Unfortunately," Mr. Gill declared, "little consideration has been given to the relation between price and supply, though the industry's briefs contain ample support for its affirmation that higher prices would bring greater supply."

Failure of the Government to approve the recommendation of the Petroleum Administrator for War for a general increase in the prices of crude oils and products may prove to be the most significant economic fact of the current war period, Mr. Gill said.

The plea for reversion to exploratory methods which proved successful in the early and middle 1920's was reiterated by Wirt Franklin, special assistant to the deputy petroleum administrator. He told operators that he had received favorable replies from 22 major company executives to his plea for a more liberal policy relative to assisting wildcatters either by purchasing spreads, by contributing acreage or by pledging bottom-hole money. He said that all operators, independents and majors alike, should obtain all the information possible on an area before starting drilling. However, he urged operators to return to previous successful methods and abandon the more recent trend to requirements for a "near perfect" geological or geophysical picture before supporting exploratory tests.

Eric Johnston, president of the U. S. Chamber of Commerce, was the featured speaker before the annual meeting. He addressed a capacity audience here in the Blackstone Hotel banquet hall. Business men from several Texas cities joined oil operators in the audience. He condemned isolationism and declared that this nation must be prepared to take its place in world affairs after the war. He made an especially strong plea for retention of individualism in this country's postwar participation in world affairs.

Oil men were lavish in their praise for the doctrines expounded by Mr. Johnston and it was evident that a majority of operators agreed completely with his philosophy.

Maston Nixon, vice president of Southern Minerals Corp., Corpus Christi, Tex., was elected president of the Texas Mid-Continent Oil and Gas Association, succeeding Mr. Sawtelle. L. P. Garrett, Houston, Tex., vice president of the Gulf Oil Corp., presented Mr. Sawtelle with a set of luggage, expressing the association's appreciation for his services. Mr. Nixon said that a simple policy of removing restrictions from the oil industry, permitting it to do its job in the war program, would guide his administration.

Transportation Men Honored

The transportation branch of the industry, for the first time in the history of the association's outstanding service awards, contributed recipients both of the independent and major company honorees.

Maj. J. R. Parten, director of PAW's Transportation Division, received the award for the year's outstanding service by a representative of the independents. The citation was read by Harry C. Wiess, president of the Humble Oil & Refining Co., Houston, who told how Major Parten had contributed unstintingly of his time and administrative talents in overcoming the transportation deficiency which hampered the industry through the first 18 months of the war.

In civilian life, Major Parten is president of Woodley Petroleum Co., Houston, and chairman of Premier Refining Co. His first assignment in the emergency transportation of oil was as a member of the Tanker Control Board, appointment to which he accepted in August 1941. Less than a year later he was made director of transportation and has supervised the PAW program which resulted in building or revamping about 11,000 miles of pipe line. The overland movement of oil has been raised from about 140,000 bbl. daily early in 1942 to a current rate of about 1,400,000 bbl. a day.

Burt E. Hull, vice president and general manager of War Emergency Pipelines, Inc., was the recipient of the award for a major company representative. High tribute was paid to Mr. Hull's ability both by Mr. Parten and Joe E. Bridwell, Wichita Falls, Tex., independent who made the presentation to the major-company representative. Mr. Hull has been employed by Texas Co., and its affiliates for 38 years. He is president of the Texas Pipe Line Co., Texas-Empire Pipe Line Co., Texas-New Mexico Pipe Line Co., and of Kaw Pipe Line Co. He has been the chief executive officer in construction of the WEP 24-in. crude-oil line and the 20-in. products line.

Rise of 5,000 Barrels Provided by PAW's November Schedule

WASHINGTON, D. C.—A production rate of 4,640,700 bbl. daily of all petroleum liquids during November was certified last week by the Petroleum Administration for War, a net increase of 2,000 bbl. over the October quota.

The declines in Districts 1 and 2 were offset by minor upward revisions in California and in District 3. The original quota of 1,999,000 bbl. assigned Texas in the original November schedule was later revised to 2,004,000 bbl. daily, an increase of 5,000 bbl. over the October certification.

PRODUCTION RATES IN BARRELS PER CALENDAR DAY

	November 1943	
	Certified total petroleum liquids	Estimated natural and gasoline condensate
District 1:		
New York	14,500	.....
Pennsylvania	46,300	1,300
West Virginia	15,900	6,600
Total	76,700	7,900
District 2:		
Illinois	217,600	12,600
Indiana	14,000	.....
Kansas	291,000	6,000
Kentucky	27,500	3,000
Michigan	56,100	100
Nebraska	1,600	.....
Ohio	10,100	400
Oklahoma	346,000	28,000
Total	963,900	50,100
District 3:		
Arkansas	81,700	4,800
Louisiana	375,700	22,000
Mississippi	49,000	.....
New Mexico	116,600	6,100
Texas	2,004,000	123,000
Total	2,627,000	155,900
District 4:		
Colorado	7,000	.....
Montana	23,300	300
Wyoming	100,800	2,800
Total	131,100	3,100
District 5:		
California	842,000	47,000
Total U. S.	4,640,700	264,000

Use of Naphtha in Cars Prohibited by PAW Order

WASHINGTON, D. C.—The use of naphtha in the operation of motor vehicles or boats is prohibited by Petroleum Administrative Order 18 issued October 19, which establishes quarterly delivery quotas for naphtha dealers and bulk consumers. The Petroleum Administration for War said sales of naphtha to persons not formerly using it has increased greatly in recent months and there is unmistakable evidence it is being used to circumvent gasoline rationing, and that control is necessary to prevent shortages for normal business.

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CATALYTIC CRACKING	HYDROFORMING
REFORMING	DEHYDROGENATION
HYDROGENATION	POLYMERIZATION
ALKYLATION	UNISOL TREATING
ISOMERIZATION	RETREATING
THERMAL CRACKING	SWEETENING
U.O.P. CATALYSTS	U.O.P. INHIBITORS

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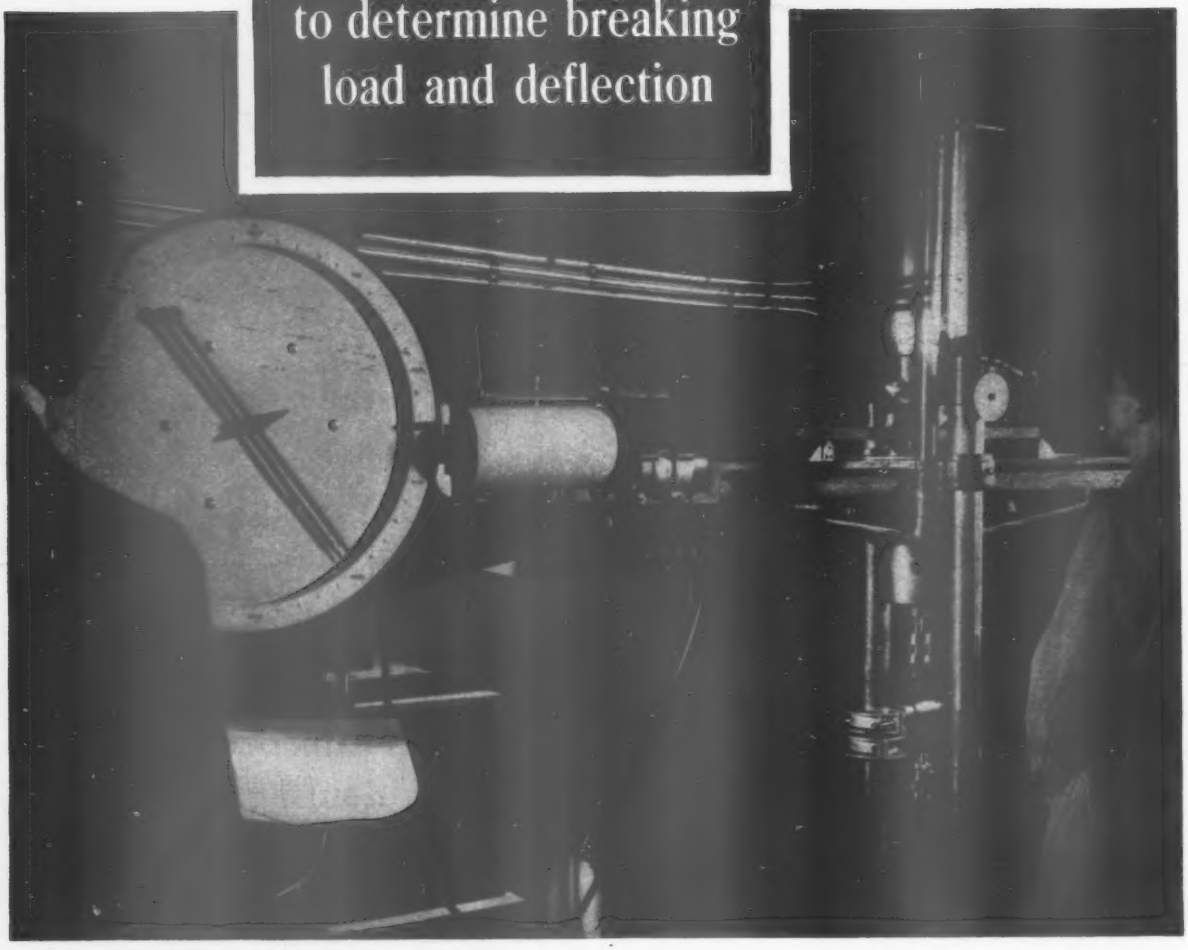
"TEST BAR" test to determine breaking load and deflection



Cast iron pipe makers are in step with American industry's wartime progress in product development. Improvements in test techniques, laboratory controls of physical characteristics of the metal, methods of inspection and analysis of raw materials — all are contributing to an improved finished product. Prompt deliveries of cast iron pipe can be now made with necessary priority rating. Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 1015 Peoples Gas Building, Chicago, Illinois.

CAST IRON PIPE

For Longer Life and Economy

Political Pressure Growing Behind Drive for Higher Crude Ceilings

WASHINGTON, D. C.—Political action to force an increase in the price ceiling on crude oil is being threatened more openly in congressional circles as the Office of Economic Stabilization delays announcing a decision on the appeal to it by the Petroleum Administration for War from the refusal of the Office of Price Administration to grant its request for an increase of 35 cents per barrel.

The petroleum subcommittee of the House committee on interstate and foreign commerce will hold hearings on the general oil situation October 21 and 22, and the price of crude undoubtedly will have a prominent place in these discussions. Chairman Clarence F. Lea of California is one of the four members of Congress who recently called on OES Director Fred M. Vinson on behalf of an unofficial group of about 100 representatives who demanded an immediate crude-price increase, and his committee is

Socony-Vacuum and Magnolia Officials Inspect New Aviation-Gasoline Plant

These pictures were taken last week at Beaumont, Tex., where Magnolia Petroleum Co. placed the first commercial Thermofor catalytic-cracking unit in operation, producing aviation-gasoline base stocks. The new facilities were described in detail on pages 30, 31 and 41 in the October 14 issue of the Journal.

Left: John W. Newton, vice president of Magnolia Petroleum Co., and manager of refinery operations, and D. A. Little, president of Magnolia, greet Arthur S. Corwin, vice president of Socony-Vacuum Oil Co., Inc., and Wilbur F. Burt, chairman of Socony-Vacuum's manufacturing committee

Below: R. R. Jackson, superintendent of Magnolia's refinery at Beaumont; Lt. Col. Paul G. Bell, Eighth Service Command, Dallas, Tex., and Dick Sanders, assistant refinery manager

Extreme Left: Dr. J. B. Rather, director of Socony-Vacuum's general laboratory; C. S. Reed, president of the Lummus Co., and J. B. Godwin

Left: W. W. Leach, assistant refinery manager at Beaumont, and L. A. Watson, Jr., safety engineer, testing for gas around the T.C.C. installation

already on record as favoring an advance. Director Vinson told the committee of four that he expected to reach a decision soon but gave no indication of what it would be.

Many independent petroleum producers have been in Washington in recent weeks conferring with their representatives and senators in the belief that political action might bring a favorable result. Several bills are pending in Congress to require the OPA to raise the crude price ceiling, and many of the oil men believe that a majority of the House would favor such a measure if it can be brought to a vote.

The Independent Petroleum Association of America is conducting a publicity campaign to explain that the present oil shortage is real and will get worse, and that the only remedy is an increased crude price to stimulate new discovery and to finance rehabilitation of older wells and fields. These producers declare that by May of 1944 oil requirements for military and essential civilian needs will be above the maximum efficient production capacity of this country, and that foreign sources of oil cannot be counted on to alleviate the shortage to any considerable extent.

Acting Petroleum Administrator Ralph K. Davies last week declared "the military requirements for petroleum products, in total, have climbed already to more than 1,000,000 bbl. per day or approximately 25 per cent of all the petroleum produced in the United States. The military demand for gasoline alone," he continued, "is 600,000 bbl. per day. That is one-third of all the gasoline we can manufacture from all the crude we produce. Next year, this military demand will be even greater, climbing probably to more than 40 per cent of our total gasoline output.

"Our tanker position is improving and, with increased transportation, we can obtain more relief from foreign sources. Therefore, as to next year, it looks now as though increased foreign production would offset increased military supplies leaving this country as we are today."

Wage Rates Approved for Five Drilling Occupations

WASHINGTON, D. C. — Uniform "approvable rates" for five rotary oil-well drilling occupations throughout 27 oil-producing states in the Mid-Continent and Southwest have been established by the National War Labor Board, for guidance of regional boards in considering wage adjustment cases in the industry.

The board, acting upon the recommendations of a panel set up to study wage problems in the petroleum industry, extended to 27 oil-producing states the wage rates established by the Eighth Regional War Labor Board in Dallas, Tex.

The "approvable rates" as adopted by the board follow: Drillers, $1.58; derrickmen, $1.10; enginemen and firemen, $1.05; floormen and roughnecks, 99 cents.

Companies must obtain War Labor Board approval before placing the rates in effect.

Mr. Davies said WLB approval of uniform minimum wage brackets for all oil-well drilling occupations throughout the entire Mid-Continent area helps to solve a critical production problem and is one of three steps in the PAW manpower program for producers. The two others are establishment, in cooperation with the War Manpower Commission, of machinery to recruit additional workers for drilling crews, and development of a plan to assure full-time employment, with overtime for all drilling employes by advance scheduling of all drilling and by the cooperative exchange and transfer of drilling personnel among contractors.

Texas Producing at Recommended Rate

AUSTIN, Tex.—Texas oil fields now are producing at approximately the maximum efficient rate recommended last May, Maston Nixon, of Corpus Christi, says in a report for the crude-oil supply subcommittee of District 3 received here last week by Beauford H. Jester, chairman of the Railroad Commission. Mr. Nixon said the subcommittee was completing a plan designed to remove the gathering-line bottlenecks from West Texas to provide crude supplies for the Stanolind Pipe Line Co. and Magnolia Pipe Line Co. lines, which are scheduled to begin operation next February or March.

Mr. Nixon gave an analysis of October allowable production in District 3 fields in relation to the recommended maximum efficient rate of last May. It showed total allowables of 2,616,420 bbl. daily in Texas, Arkansas, Louisiana, New Mexico and Mississippi, or 45,231 above the recommended maximum.

On the basis of individual fields, 211,130 bbl. daily available production was reported above the recommended amount, but a total of 256,361 bbl. daily had been allowed above the recommended figure in other fields.

DEATHS

A. L. West, 51 head of Continental Oil Co.'s land and exploration office, died in his room at a Tulsa hotel last week, following a heart attack. A native of Arkansas, Mr. West came to Oklahoma in 1916 and obtained a special assignment for the land and legal department of the old Empire Gas & Fuel Co. Later he became a farm boss and then assistant district superintendent. He joined Marland Oil Co. in 1929, as head of the Tulsa office. He continued as manager of the enlarged office when Marland and Continental were merged.

William H. (Bill) Bagley, 78, veteran employe of Oklahoma Natural Gas Co., died October 16 in a Tulsa hospital, following a short illness. Mr. Bagley began his association with Oklahoma Natural in 1905, with the old Osage and Oklahoma Co. of Indian Territory. He retired from active service in 1941.

Phil J. Cannon, 48, manager of the Tulsa Club, at Tulsa, died last week from a heart ailment. He came to Tulsa in 1928, and was well known to oil men who frequented the Tulsa Club.

R. W. Lindsay, 56, former oil operator of Wichita Falls, Tex., who moved to McAllen, Tex., in 1937, died in a hospital in the latter city last week.

George T. Hutchison, 65, member of the Old Timers association of the oil industry, who retired from Sinclair Prairie Oil Co. 14 years ago, died at his home in Tulsa last week. He had been associated with Sinclair Prairie and its pipe-line division for nearly 20 years, serving variously as steel storage, production and pipeline superintendent. He had lived in Tulsa since 1916.

Carlton Abraham Young, 75, a former official of Standard Oil Co. of California, died last week near Oil City, Pa. For many years he was superintendent of production for Standard of California. For the past 10 years he has made his home in Pennsylvania.

Edward E. McMahon, 58, shipping supervisor for Imperial Oil refinery at East Calgary, Alta., died of a heart attack. He had been employed by the company for 25 years.

Edward M. Metz, 69, retired employe of Oil Well Supply Co., Oil City, Pa., died in a hospital in that city following a lingering illness. He was retired from Oil Well Supply Co. in 1939, after 37 years of service.

Charles J. Kulling, who was employed by Pennzoil Co., Oil City, Pa., for 48 years before his retirement earlier this year, died in Oil City last week. He had served as foreman for 28 years.

H. H. Hammond, 74, life-time worker in the Pennsylvania oil fields until he retired a few years ago, died in Bradford, Pa.

Operating Features of Project Five El Dorado-Helena Products Line

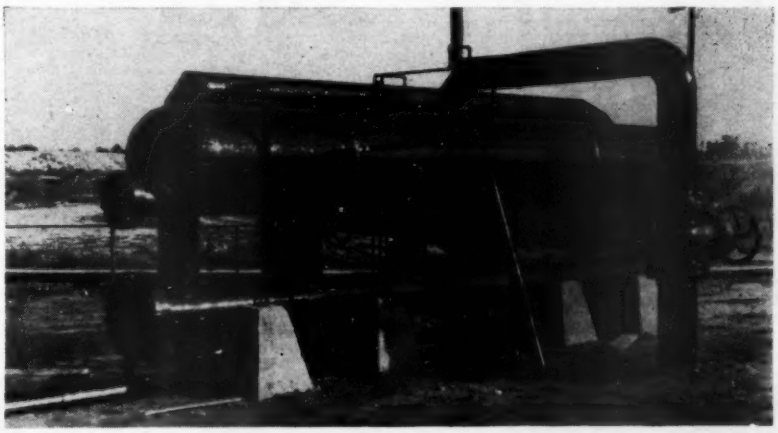
by Paul Reed

First, Project Five and, later, Bayou Pipe Line System have both demonstrated how the industry can make entirely new products line systems out of equipment salvaged from crude-oil pipe lines. Operating features of Project Five are discussed including tanks, pumping equipment, controls and scale traps for removing suspended matter from fluid passing through the line.

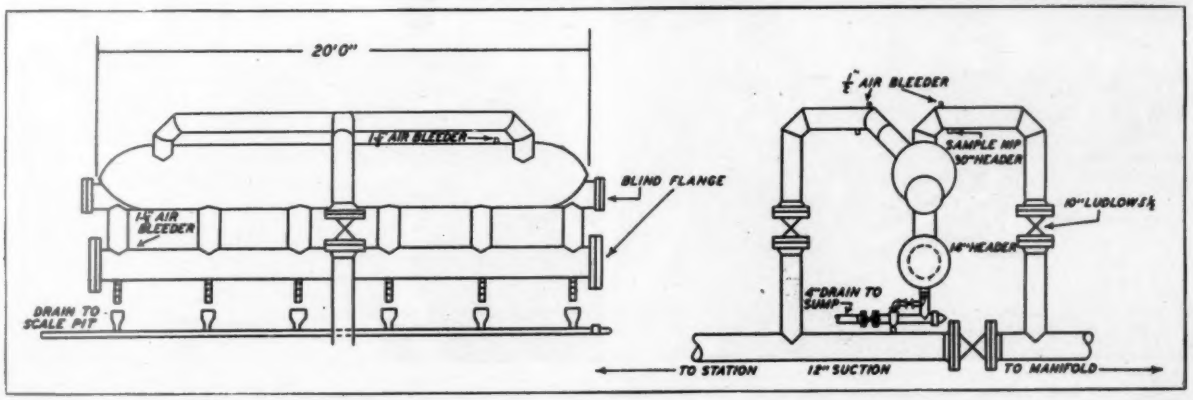
AMONG the wartime efforts of the oil industry for increasing shipments to the East, Project Five is a notable demonstration of what can be done to contrive an extensive system by utilizing material on hand. Through use of barge transportation at one end and conversion, reversal and relaying crude-oil lines on the other, an entirely new system was developed within a few months for delivering refined products from the Gulf Coast to Pittsburgh, Pa. In fact, it was the first new wartime project completed for making deliveries for the petroleum industry from Texas to an Atlantic seaboard state.

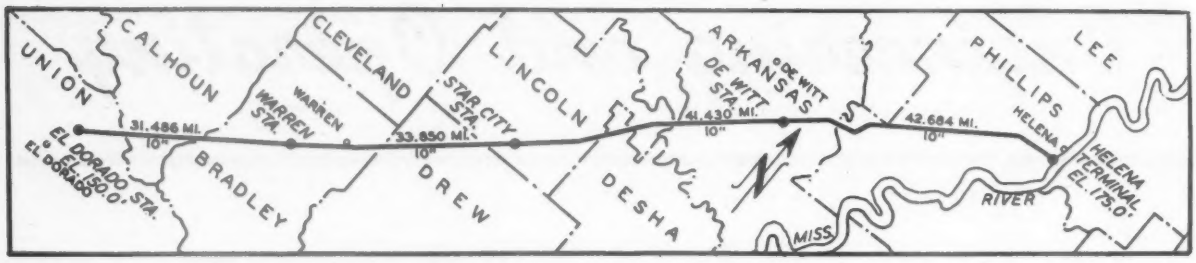
This article is primarily concerned with equipment and operating features of the 149 miles of the 10-in. line laid from El Dorado to the Mississippi River terminal at Helena, Ark., at a cost of about $3,700,000, handled by private financing. It is operated by Project Five Pipe Line Corp., formed by Gulf Refining Co., Socony-Vacuum Oil Co., Inc., Texas Co., Premier Oil Refining Co. and Lion Oil Refining Co.

The rate of progress in its construction is indicated by certain significant dates of last year. Work was commenced as follows: Aerial survey, May 18; ground survey, June 19; clearing of right-of-way, July 15. Backfilling of the line was completed November 18. Pumping started at the El Dorado station November 20. And



This picture and sketch illustrate scale trap at El Dorado station which is similar to equipment at all Project Five stations for removing suspended matter from fluid





Route of Project Five El Dorado-Helena products line

the first barges were loaded on the Mississippi River December 5.

Since then the project has had a consistent record for delivering between 40,000 and 58,000 bbl. daily of refined products which are brought to El Dorado by the following lines: Gulf Refining Co.'s 372-mile, 8-in. Port Arthur, Tex., to El Dorado, Ark., reversed and converted from crude-oil service; Texas Co.'s 187-mile, 8-in.. Port Arthur-Shreveport, La., reversed products line with a 15-mile extension to reversed and converted 74-mile, 8-in. line of Magnolia Pipe Line Co., Benton Junction, La., to El Dorado.

Pipe for the El Dorado-Helena 10-in. line was dug up from the Gulf-Magnolia line between Ranger and Panhandle, Tex., which was double-jointed, cleaned, coated and wrapped. Less than 15 per cent of the salvaged pipe was unusable.

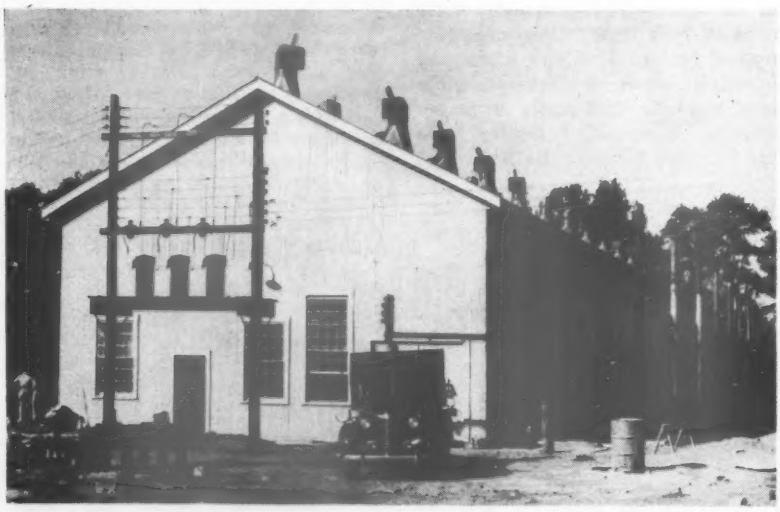
On this line pumping is done by reciprocating pumps at the initial station and centrifugal pumps at three intermediate stations. The El Dorado station, originally a Gulf crude-oil station, has seven units, formerly in crude-oil service, consisting of 5 by 20 reciprocating pumps each driven by a 150 hp. semi-diesel engine built during the last World War. Engine fuel is No. 2 heating oil transported through the line which proves to be highly desirable since it is clean and leaves little carbon to cause valve trouble.

The three centrifugal pump stations are of two types.

The Warren station has four 6 by 8 centrifugal pumps, each driven by a 400-hp. electric motor. The pumps, like those at the other two stations, are installed to operate in series.

The Star City and DeWitt stations are of the same type. Each has a 6 by 8 centrifugal pump driven by a 1,000-hp. motor and two 6 by 8 pumps, each driven by 400-hp. motors.

When the volume of fluid handled declines, only the large pump is used. For maximum loads, fluid from the smaller pumps flows into larger pumps at each station.



El Dorado pump station building

Operating Pressures

Operating pressures are held close to 800 lb. At El Dorado, pressure generally does not exceed 775 lb. When the large centrifugal pumps are in service, suction pressure at the intermediate stations is 40 to 50 lb. Discharge pressure at Warren is usually 750 lb. and at Star City and DeWitt it is frequently more than 800 lb.

Mercoid automatic controls provide for shutting down centrifugal units when pressure drops to 20 lb. and

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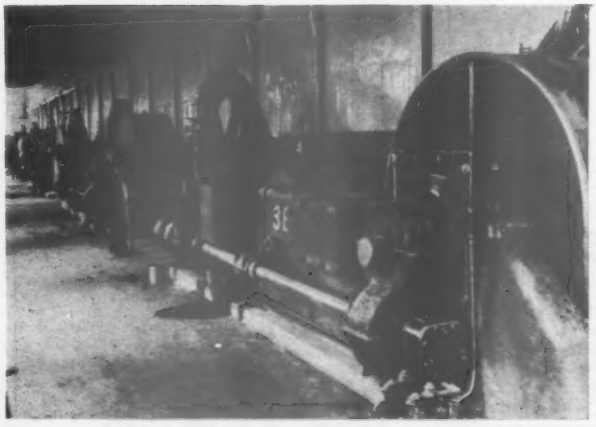

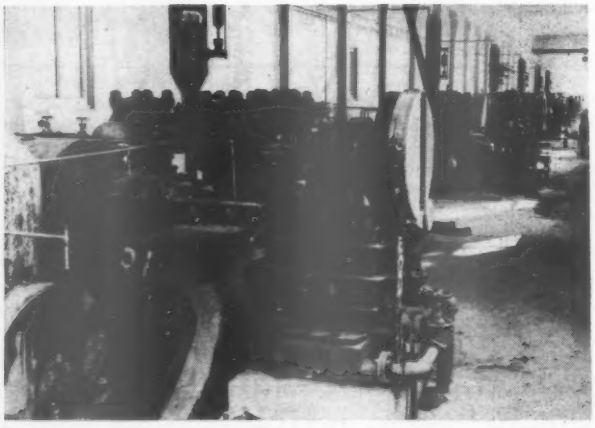

Left: 150-hp. semidiesel engines at El Dorado station. Right: 5 by 20 reciprocating pumps at El Dorado station

Effect of Sulfur in West Texas Crude on Refinery Operations

Desalted sour crude shows little if any corrosion of equipment in primary atmospheric distillation equipment, or at temperatures below about 675° F. Ammonia is a satisfactory anticorrosion agent for use in primary or topping distillation of sour crudes from West Texas. High alloys such as 18-8 steels, or at least 4-6 chrome steels are the only dependable protection against sour-crude corrosion in cracking stills, chemical neutralization being inadequate. Gunite linings are serviceable at lower temperatures such as in the flash section of towers. Alloy sheet linings are more serviceable and longer lived, but are also more expensive.

by B. I. Scoggin* and G. H. Burruss†

THE important fact about sulfur content of West Texas crude is that it is always available not only from field to field but within each field. Most West Texas fields produce from zones rather than from one major sand. The producing zones are made up of many sands of an apparent lenticular character. Sometimes offset wells may vary 100 per cent in sulfur content. Therefore, if you are considering the use of West Texas crude in your Mid-Continent refinery, it is necessary that you maintain continuous records, first, of crude-oil analysis and, second, of the materials produced from a given refining operation. In our own refining operations we have made a practice of making crude-oil analysis upon the average crude from a given area as represented by pipe-line movements, then maintain daily routine checks of the sulfur content of the gasoline streams. Any noticeable variation in the sulfur content of the gasoline produced can then be recorded and eventually correlated with analysis of the crude oil from sample obtained near its source. Over a period of time this will prove to be very useful information.

Fig. 1 shows a form of graphical presentation of crude-oil analysis that has been found useful in planning operations on West Texas crude oil. Examination of the curve for the sulfur content versus the curve for octane number shows the definite relationship between these two properties. Often it will be more practicable to operate from the standpoint of a given yield of a certain sulfur content product than to operate with a given yield of a certain end-point product. For a successful operation with West Texas crude oil sulfur determinations become routine operational duties, equally as important as any other form of data used in plant control operations.

Incidentally, from a practical standpoint, we have in recent years found very little practical use of total sulfur content of a crude oil. First, the testing procedure is a long one of questionable accuracy when performed by routine testers; second, the sulfur content of the gasoline stream can be safely used in calculating sulfur content of other products, that is, in so far as refining operations are concerned. The lamp method of determining total sulfur content of gasoline is a more rapid and dependable test procedure. In Table 1 is a breakdown of West Texas crude oil into various types of products. Note that the crude oil had a total sulfur content of 2.86 and that evidently this sulfur content is distributed through the various products in proportion to the molecular weight and boiling point, the low-end-point gasolines having the lowest sulfur content and fuel-oil asphalt having sulfur content of above 4 per cent.[2] Until recently there were a number of federal government and state specifications requiring that motor gasoline have not more than 0.1 of 1 per cent sulfur. However, there has been an enlightened viewpoint on this subject and the federal Government has changed specifications to allow up to 0.25 of 1 per cent sulfur in gasoline used by the federal Government.

It is finally realized that any motor that is actually harmed by high-sulfur motor fuel will also be harmed to an almost equal extent by the use of any other type motor fuel. One of the classical examples of this behavior was brought out a number of years ago when the manufacturer of certain types of automobiles advised a manufacturer of a high-sulfur-content benzol that if the sulfur content was not lowered he would be forced to advise the distributors of his automobiles and their customers not to use the benzol high-sulfur content. The benzol manufacturer investigated the problem and after due consideration advised the automobile man as follows, "Go as far as you like, but at the same time we will be forced to advertise something else that may be news to you. Yours is the only one of many makes of automobiles in which this benzol has been used in which it has caused corrosion."[3] A subsequent investigation of this problem yielded the feature known as crankcase ventilation.[4]

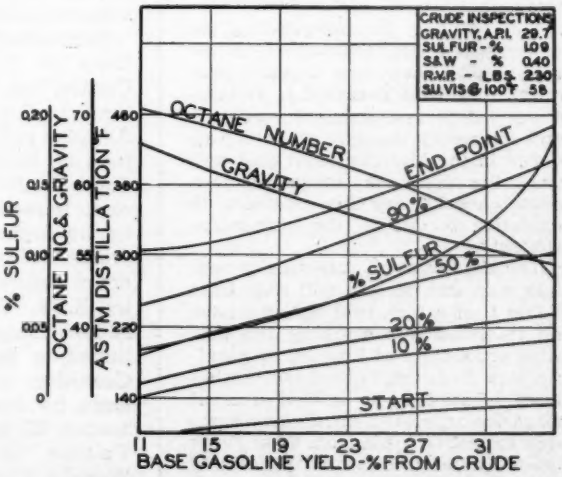

Fig. 1: Gasoline inspections versus yields from Mitchell and Howard counties mixed crude

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This article is a slightly abbreviated version of a paper presented at the meeting of the Western Petroleum Refiners Association, at Tulsa, October 12.

TABLE 1—CRUDE-OIL ANALYSIS OF WESTBROOK CRUDE, MITCHELL COUNTY, TEXAS

	Crude Charge	GASOLINE STOCKS 350 E.P.	375 E.P.	415 E.P.	435 E.P.	450 E.P.	LIGHT DISTILLATE 35.Gravity	32.Gravity	GAS OIL	FUEL OIL RESIDUUM after 415 E.P.	after 35.Gravity	after 32.Gravity	Asphalt
% Yield from Crude				32.00						67.00			
" " "				32.00			6.10				60.90		
" " "				32.00				12.20				54.80	
" " "				32.00				12.20	21.60				33.20
" " "		22.85	26.90		34.05	35.10	6.10	12.20	21.60	67.00	60.90	54.80	33.20
Gravity	22.5	52.1	50.8	49.2	48.7	48.2	35.1	32.5	24.4	14.3	12.3	11.6	
Flash - C.T.							164	173					
" - Clev.									280	260	295	325	
Vis.at 100°F.	74						33	35	55				
" " 130 F.										260	540	1140	
" " 210°F.										69	106	152	
" Illuminating							490	Too Heavy					
Pour							-25	-20	60				
Solid							-30	-25					
Color - Saybolt		/25	/25	/23	/21	/16	- 6	B-16					
Doctor Test		Pos.	Pos.	Pos.	Pos.	Pos.	Pos.	Pos.					
Strip Copper		Good	Good	Good	Good	Good							
% Sulphur	2.86	0.12	0.15	0.20	0.23	0.25	0.89	1.23	2.13	3.45	3.88	4.02	
% S&W	0.60												
% Mercantans				0.047									
Oct. No.		62.5	59.0	54.5	53.0	52.0							
A.S.T.M. Dist.													
Start		135	140	144	145	145	436	439	500				
5%		178	183	188	190	191	453	468					
10%		192	200	210	212	215	457	475	574				
20		212	222	232	234	237	462	481	590				
30		228	238	252	256	258	465	487	602				
40		241	254	270	275	277	469	492	616				
50		253	269	288	296	298	473	498	626				
60		264	285	309	320	322	475	505	640				
70		272	295	328	343	349	481	513	655				
80		288	315	354	374	382	487	525	674				
90		308	340	386	408	418	497	543	700				
95		328	360	408	434	444	509	560					
End Point		350	379	418	440	456	515	569					
% Recovered		97.50	98.00	98.00	98.00	98.00	98.00	98.00	90.00				
% In Flask		1.00	1.00	1.00	1.00	1.00	2.00	2.00	10.00				
% Loss		1.50	1.00	1.00	1.00	1.00	0.00	0.00	0.00				
% @ 212 F.		20.00	14.50	11.00	10.00	9.00							

Asphalt Analysis

Penetration	188
Melting Point	103
Ductility	100/
Flash	495
Sol.in CS_2	99.9
" " CCl_4	99.9
" " 86° Naohtha	88.0
Fixed Carbon	8.4
Loss @ 325°F. 5 Hrs.	0.1
Pen. of Residue	154
Shattuck Oxidation Test	Excellent
Benson Film Test	"
Ductility after 24 Hrs. heat loss	100/

Without such ventilation extremely corrosive compounds will form from carbon dioxide and water plus presence of chlorine and bromine that are a part of tetraethyl lead compounds. Actually, straightrun gasoline from West Texas crude oils is a better grade of motor fuel than the straightrun gasoline manufactured from Mid-Continent crude oils. The question of sulfur content is interesting and important from the standpoint of process control and equipment protection, but of no practical significance from the standpoint of motor-fuel use.

You may not be interested in asphaltic materials; however, it is interesting to know that asphalts produced from West Texas crude oil have a very high resistance to oxidation and are among the only asphalts produced in the Mid-Continent that will pass the Shattuck oxidation test. Some chemists say this resistance to oxidation is due to the high-sulfur content.[5]

The heavy gas-oil cuts usually contain wax and, as you will note from Table 1, of a high cold test. We have no information concerning the possible production of lube oil or paraffin wax from this type crude. As has been mentioned in several current magazine articles,[6] a satisfactory kerosene cannot be made from West Texas crude by the process used in refining Mid-Continent crude. There is a possibility that the Government may need considerable quantities of diesel fuel. At present the Army purchases diesel fuel under three types of specifications known as A. B and X.[7] The A and B grades are the type diesel fuel ordinarily manufactured from Mid-Continent crude. Grade X can usually be manufactured from West Texas crude, particularly if the West Texas crude can be blended with a small amount of distillate from Mid-Continent crudes. We understand that Grade X, which is specified for operations in cold climates, is more difficult to procure than Grades A and B.

It is easy to see from the above brief resume of petroleum products manufactured from West Texas crude that there are certain disadvantages in blending West Texas crude with Mid-Continent crude and then processing the blend. While such an operation might be entirely satisfactory from a strictly operational standpoint, the mixed products would certainly be advisable to process each type of crude separately, then blend the product to meet customer requirements.

Crude Storage

After thorough consideration of West Texas crude oil from the standpoint of analysis and products, we next have to consider storage of crude oil prior to first distillation. Storage-tank corrosion from high-sulfur crude is mainly the result of breakdown of hydrogen sulfide when mixed with air, forming elementary sulfur and water. Naturally, all storage tanks should be effectively sealed regardless of the type crude stored, but with crude containing large quan-

SYMPOSIUM ON REFINING SOUR CRUDE

This is the seventh article to appear in The Oil and Gas Journal in recent months on the important subject of refining sour crudes. Articles previously published are:

Neutralization, Alloy Steels Used in Handling Sour Crudes, by J. P. O'Donnell, June 3; California Plant Adapted to Refine Sour Crude, June 17; Sulfur Removal From Sour Crudes Reduces Corrosion, Improves Product Quality, by Arch L. Foster, June 24; Problems Involved in Conventional Refining of Sour Crude, by R. B. Waite and R. H. Aitken, August 5; Alloys Best Suited to Resist Sour Crude Corrosion at High Temperatures, by Arch L. Foster, September 30; and Refining West Texas Crude, by H. H. Wenzke, October 14.

tities of hydrogen sulfide, sealing to prevent air entrance is of more importance. The worst corrosion is in the producer's tank where the crude contains the maximum H_2S, and usually the least attention is given to breather valves, etc. Corrosion is progressively less from producer's tank to pipeline gathering system and thence to refining storage. We have $\frac{3}{16}$-in. steel roofs on storage tanks in crude-oil service for 8 years.

Safety Precautions

The danger of hydrogen sulfide gas is obviously in proportion to the amount of gas present. This danger is of course greatest in production operations and decreases as the crude loses hydrogen sulfide during transportation. Crude-oil storage tanks in the refinery contain a high percentage of hydrogen sulfide. Operators who have occasion to open gage hatches of crude-oil tanks should be cautioned concerning inhaling the poisonous hydrogen sulfide fumes. It is also advisable that vapor recovery lines from crude tanks be disconnected from vapor recovery. At other points where hydrogen sulfide will be particularly evident will be in connection with the noncondensable gases from cracking still which the usual refiner uses as a fuel. This gas will contain a high percentage of hydrogen sulfide and will require the usual precautions.

I am acquainted with the circumstance of only one fatality from hydrogen sulfide gas in a refinery. That happened 12 or 14 years ago when the caustic that had been used in scrubbing the hydrogen sulfide from straightrun gasoline was dumped into the plant sewer lines. Acid sludge from another portion of the plant was dumped into the same sewer system. The reaction between the sodium sulfide and sulfuric acid resulted in the release of a large volume of hydrogen sulfide. This release of large volumes of hydrogen sulfide resulted in the death of a pump mechanic who was not aware of the fact that the volume of hydrogen sulfide had been materially increased. It is sometimes difficult to explain to workmen that hydrogen sulfide in the pure form is actually an odorless gas and that it is only the low concentrates that are so noticeable.

Pretreatment of Crude Desalting

Many refiners ask for information concerning a type of treatment that can be applied to the crude oil prior to processing that will eliminate the hazards of corrosion to the processing equipment. No such treatment has yet been made available to the refining industry. However, almost all operators who are using West Texas crude have some type of desalting operation prior to first distillation.

Hydrogen sulfide that is present in the crude oil will combine directly with metals to form iron sulfide, but such a coating is actually a protective coating and additional corrosion due to sulfur will not occur unless this sulfide coating is removed. The magnesium and calcium chlorides present in the crude oil tend to break down at the temperatures of distillation, forming hydrogen chloride gas that is very corrosive and will immediately remove the sulfide layer so that the principal corrosion in the first distillation is first conversion of the metal into an insoluble sulfide and then the solution of this sulfide by hydrochloric acid. Effective desalting will decrease the formation of hydrogen chloride and thus decrease corrosion.

Mid-Continent refiners ot West Texas crude will have one definite advantage over those refiners who process the material in West Texas. For instance, one of the most efficient ways to remove salt is through the use of electrical desalting.[5] This electrical desalting requires the addition of some fresh water to the crude, then the total water content is precipitated in the electrical precipitator. This usually results in removing of from 90 to 95 per cent of the salt and filterable solids, some H_2S, and elementary sulfur. For this operation to be effective, the fresh water that is added must be low in salt content. There are several regions in West Texas where the fresh water used in refining process will contain more salt than is contained in the crude oil. Under such conditions the only possibility is to desalt through heating of the oil, permitting the water and salt to settle through one of the so-called "gun barrel" settlers. The removel of this salt reduces the coke deposit in all parts of the first distillation heaters and has a very definite bearing upon corrosion.

First Distillation

Generally speaking no special alloys are required in the crude distillation equipment for satisfactory service and reasonable life of equipment. At the usual temperatures of first distillation there is no excessive corrosion in the heater tubes or headers. As a matter of interest the crude fractionating column that is at present in service in one of our plants was installed in 1927 with a shell ½-in. thick at the start. It is now ready for replacement. Pumping equipment is one exception to the statement concerning alloy metal. From the standpoint of mechanical efficiency and reduction in maintenance to pumps, pump packing, etc., we are using 18-8 chrome nickel covered rods, valves and seats on a hot-oil crude charge pump (275° F.) and 18-8 chrome nickel covered rods on the hot-tar pump (550° F.). We also find it an advantage to use alloy metals on gasoline reflux pumps. We are using monel rods and Dura-bla valves with "Ni-Resist" liners and pistons. Condensing equipment is cast iron, heat exchangers are steel with admiralty metal and steel tubes. Aftercoolers on gasoline are steel shell and tubes.

If the crude has been thoroughly desalted, it will still be necessary to add some ammonia into the first distillation vapor lines and condensers. We use aqua ammonia pumped by centrifugal pump from storage. The aqua ammonia is measured by a rotometer. It is introduced on the top fractionating deck of the crude-oil fractionating column. Introduction at this point gives better distribution and takes care of corrosion that may be accelerated at the point where reflux is added. We control the quantity of aqua ammonia by maintaining a pH 0.8 on the condensate water. This is checked hourly by the use of a Universal indicator by the stillman. Once daily a check is made with the electrical potentiometer in the laboratory as a means of checking the operator's interpretation of the Universal indicator. There are a number of other controls that could possibly be used. Indicators such as phenolphthalein and methyl orange have too wide a range for application to this problem. We use from 0.015 to 0.03 lb. of aqua ammonia per barrel of crude. Much is said in current literature[6] concerning the possible formation of ammonia chloride that will plug vapor lines and tower.

Efficient and thorough scrubbing of the gasoline stream prior to entering the rundown tank is very important. If a refiner is equipped in the usual manner with vapor recovery connections to rundown tanks, the presence of hydrogen sulfide in the rundown tank will pass from the rundown tank into the vapor lines and may even be absorbed into all other tanks, finished gasolines included. The amount of caustic used for this scrubbing varies with the efficiency of the scrubber and the actual hydrogen sulfide content of the crude. It is possible to remove hydrogen sulfide with 0.2 and 0.3 lb. of caustic per barrel of crude charged.

Cracking Still

Corrosion becomes a serious problem in cracking still units or vacuum still units, or any place where it is necessary to heat the charging stock to above 675° F. We know that increased corrosion which we call "hot corrosion" starts at approximately this temperature and increases with increases of temperature, depending somewhat upon the exact nature of the charging stock.

In Fig. 2 we show corrosion rates versus temperatures as measured from tube to tube in the heater of the reforming still. Changes in pressure and temperature will have an effect upon the exact crest of this curve; also the type of charging stock processed in a given heater will ma-

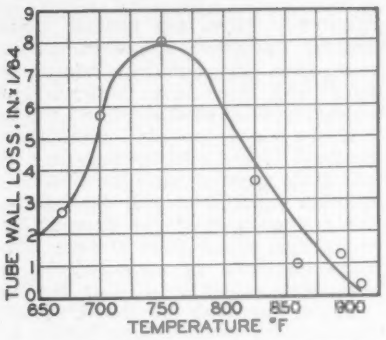

Fig. 2: Corrosion rate versus temperature in a reforming unit

terially affect the shape and crest of this curve. The important feature is that such a relationship can be established for almost any heating unit. The data for constructing such a curve necessitates very careful inspection, which, in itself, is good training for plant inspectors. Once the data are collected they provide a direct clue to the points of maximum corrosion. They will show alloy steels would be of maximum benefit, etc.

Our cracking plant equipment contains several types of alloys and some regular carbon steel as follows:

All tubes, return bends and hot transfer lines are 18-8 chrome nickel. The vapor column has a lining of 11-13 chrome steel spot welded to the steel shell. The soaking chamber is lined with a composition material that both protects and insulates the vessel. The hot oil circulating pump is 11-13 chrome. Incidentally, we have found no measurable corrosion of 18-8 chrome nickel steel in any sour crude operation regardless of temperature. The fact that 18-8 chrome nickel steel costs at least 12 times as much as regular steel is a very real barrier against extensive use of this metal. Starting with the vapor line from the vapor column, all beyond is ordinary carbon steel equipment. No neutralizing agents are used in the cracking plant condensing system.

Practically all refiners operating cracking stills in West Texas charging stock, who are not equipped with 18-8 steel in the critical zones mentioned above, use at least 4-6 chrome with the addition of lime to the cracking still charge. We have been told that lime up to 1 lb. per barrel has been used in combating corrosion in the cracking still.[11] However, there will still be some corrosion at points where the temperature is above 700° F.

We have conflicting opinions expressed in literature as to which type of sulfur compound is the most corrosive. Marks states[10] that the mercaptan sulfur compounds are the most corrosive of sulfur products; however, we have been unable to prove that mercaptans are actively corrosive. All corresion problems that we have studied in connection with refining of West Texas crude have been corrosion in the presence of H_2S. The fact that so-called hot corrosion starts at temperatures around 700° F. or above can be tied to the fact that most West Texas crude will show some cracking action and hydrogen sulfide formation at the same temperature. In one test that was made it was found that each 0.1 lb. of lime added per barrel charging stock would reduce the hydrogen sulfide by approximately 30 grains per 100 cu. ft. of gas. No doubt this figure will be different for each type of cracking operation.

Many refiners ask questions regarding the possibility of reducing corrosion by blending the high-sulfur-content crude with a crude of less sulfur content. While we doubt this would be advisable in the production of gasoline, kerosene and distillates, it might have beneficial effect on charging stock gas oils for pressure stills. We would expect that the possible benefits could be measured by quantity of H_2S in the gas production, the same as benefits of treatment with lime can be measured.

Other Parts of Distillate Equipment

No doubt many of you have gas-oil stills or vacuum units used in the production of heavy distillates. Such equipment usually operates at temperatures above 675° F. and will be subject to corrosion the same as other points at high temperature in refining processing. Under such conditions you can expect corrosion on outlet tubes and vapor line. Here, again, ammonia can be used to offset the corrosion cycles. If alloys are available it is advisable to line the tower with 11-13 chrome. In one such operation we used approximately 0.03 lb. of aqua ammonia per barrel of charge.

Sweetening Processes

The first treating processes for petroleum distillates containing sulfur were primarily processes used for odor improvement. Such processes are usually called "sweetening processes." Practically every refiner who operates a cracking still also operates some type of sweetening process.

All of these processes[12] convert mercaptan sulfur (that is, the strong-odor sulfur compounds) into a mercaptide sulfur that has reduced odor. Each is dependent upon accurate control procedure for efficiency. I believe little detailed explanation of this difference will tell what is meant by adequate control. If one of the several processes mentioned above is installed in a given refinery that previously used one of the other processes without accurate control, there will be considerable improvment in the products and reduction in cost. It may be noted as increased susceptibility, decreased corrosion, etc. This improvement is usually due to improved control technique.

In doctor treating and lead sulfide treating, it is very important that treating be accomplished without the addition of excess elementary sulfur. This can be accomplished by the use of butyl mercaptan test procedure as described in the U.O.P. manual of laboratory test methods.[13]

Likewise, if copper chloride process is used there must be an absolute guarantee that copper compounds are not allowed to remain in the gasoline, forming metallo-organic materials that are very active gum formation catalysts.

We believe there is very little discussion needed on hypochlorite treating. Our experience has shown that hypochlorite treating is seldom effective for mercaptan content above 0.03. Also, it is obvious that hypochlorite treating would not be used on a cracked distillate due to the possibility of chlorinating the olefin and diolefin contents.

Treating West Texas crude oils for mercaptan content will not necessarily change your treating methods. However, it will change the degree and properties of everything about treating. Chemical costs will increase in proportion to the increased sulfur content. All constituents of a treating process will need to be considered from the standpoint of increased efficiency. For instance, if you are using a process where it is necessary to add air to furnish oxygen for one phase of the process, you will probably see that 10 to 20 times as much air will be needed for treating the materials of high mercaptan content. This increased volume of air will add a new problem of vapor loss.

Sulfur-Extraction Processes

The manufacture of high-octane gasolines has brought into focus the effect of sulfur content upon increase in octane by the use of tetraethyl lead. Fig. 3 shows the relationship

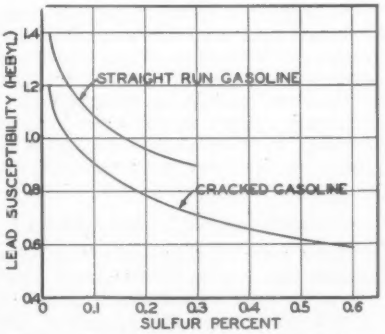

Fig. 3: Effect of sulfur content on lead susceptibility of West Texas straight-run and cracked gasolines

and Hebyl susceptibility for straight-run and cracked gasolines of varying sulfur content. A number of processes

(Continued on page 84)

How Operators Are Fitting Drilling Equipment and Practices to Conditions

*by M. Lyle Cashion**

The lowering of specifications for oil-field materials has caused considerable difficulties, involving breakages and shutdown time. The experiences of one major company in this connection are related in this article, together with suggestions for the maintenance of prewar equipment still in use. The author also discusses the manpower situation and makes suggestions for the improvement of delivery of materials and a speeding up of the drilling campaign.

SMART operators have always taken care of their equipment. Recently we have redoubled our efforts in this respect. We have always painted our rigs when running and when stacked. In stacking our rigs, or when rigs are shut down for comparatively long periods we have filled our crank cases with oil. We have filled our fluid and steam ends with oil and sealed them up to preserve this equipment. We are painting or oiling our drill pipe inside and outside. We are painting our boilers, swabbing the flues and fire boxes with oil, and we are keeping the boilers full of water up into a nipple connected to the steam outlet to prevent internal corrosion rather than leave them open and dry as has been done heretofore. We are consistently doing these things more diligently than ever before—trying to make our rigs last for the duration—for we well know or have been told that there will be no more good equipment, and that that which is available will be of inferior workmanship and material.

Quality of Steel

We are using inferior steels in our casing programs. Steel far too soft in many cases. And we are told that rubber for drill-pipe protectors will be withheld, so we have the problem of protecting our casing and our drill pipe that is inferior in quality and for that reason, more easily worn thin, and we are told we will be unable to get rubber protectors in the near future. Perhaps synthetic rubber will do, though I do not believe that any one synthetic rubber can meet the specifications for deep drilling.

Certainly holes have been worn in this H-40 and other casings. I know of several jobs within the last month or two, in which holes have been worn even when the kellys, blocks, rotaries, etc., were carefully lined up. The drilled holes were straight, everything was as it should be but the casing was soft and the protectors were worn down and still in use. Full-size protectors were ordered, but because of poor deliveries they had not reached the location. It is believed that the minimum amount of steel can be used in casing and drill pipe only by using good drill-pipe protectors. Safe operation demands it.

Drill pipe is being run longer and more care is being taken of drill pipe than was thought possible, prior to the emergency. All of us are watching our pipe closer than ever before. We are inspecting it internally by tuboscope and externally by micrometers. The bad joints are culled, the others repaired. We are replacing tool joints when obtainable — rebuilding tool joints when we must. Many are using double-pin or double-box drill pipe with relatively inexpensive wear subs in between. These wear subs can be rebuilt or replaced at nominal cost if obtainable. The wear sub costs about the same as the rebuilding of a tool joint. Various methods of applying tungsten carbide or other hard-facing materials to tool-joint boxes are being developed. I am told these methods increase the life of the tool joints from 25 to 100 per cent. The cost of the hard facing is relatively small, not exceeding $12 per joint, and will result in considerable saving of money and steel to those who use it. This metal is laid on in various ingenious ways in such manner as not to increase the outside diameter of the boxes nor to interfere with the operation of the elevators.

I know that most of you keep several good joints of pipe immediately above the drill collars and that you change these joints around so as not to run the same pipe in the same position too long.

Recently, one operator sent 12 joints of new N.E. (National Emergency) pipe to each of his rigs after having several fishing jobs, owing to breaks at the top of the drill collar, with the thought of running these joints on top of the drill collars and thereby minimize breaks for some time to come. Strangely enough they had fishing jobs one after another immediately after placing the new pipe on bottom. It might have been a coincidence that all of the bad joints were placed on top of the drill collars at the same time, but I'm not so sure. We are told that N.E. steels properly heat treated are the equivalent of the S.A.E. steels we formerly used. However, performance to date refutes the argument. We are continuing to try to make the drill pipe work. We will finally weld the joints and do everything to make it work. I sincerely hope that it will work, but if we continue to have fishing jobs—what can we conclude but that the N.E. pipe is not adequate?

Drill Collars

The story is the same with drill collars. All of our replacement drill collars and subs are N.E. steels. We are having more drill-collar trouble than before the use of the N.E. material. All of us have our drill collars and subs heat treated. We have them magnofluxed repeatedly, to find hidden fatigue cracks and thus save untimely fishing jobs. We have known for some time that we cannot have a box cut in one shop on one lathe, properly fit a pin made in another shop on another lathe, in spite of the fact that both may have been gaged properly. All shopmen know this, and will admit it when pressed. We have gone to the trouble to have all box and pins cut on one lathe in one particular shop. We carefully make up our joints, using the best joint compound we know of. We break and inspect our joints each trip. We rethread our collars and subs regularly and yet we have trouble. We use tapered drill collars or flexible drill collars at the top of our drill-collar strings to relieve the concentration of stress, as we change from the heavy stiff drill collars to the drill pipe. We have not taken too much care to have our boxes accurately lined up. That will be done, yet we are constantly

*Gulf Oil Corp., Houston, Tex.

Heavyweights
FOR HUSKY WORK

The three units of pre-fabricated piping shown here, together with the 8" 2500 lb. carbon moly flanges, aggregate approximately six tons. These heavyweights (1⅛" pipe wall thickness) are designed for use on operating pressures of 5400 p.s.i. This job required, among other operations, reinforced nozzle welding and circumferential butt welding–all handled by certified welders using modern pre-heating, stress-relieving equipment.

The character of this work gives clear perception of the full scope of service Associated offers in the field of industrial piping.

WAR PRODUCTION...This company is engaged in high priority war production, proud of its responsibilities and fulfilling them to the letter.

ASSOCIATED PIPING & ENGINEERING CO., INC.
2332 EAST 38TH STREET
LOS ANGELES, CALIFORNIA

delayed in our hurried search for oil by too many fishing jobs.

Then when you have a fishing job you may have to use a tool of inferior steel, of unknown or doubtful strength. If any special-size subs or parts are necessary for your fishing job, chances are the steel is not available to make the needed sub or part, and you have to take some good sub you have on hand and cut it up to meet the emergencies.

The writer recently cut 30 in. off a good drill collar to make a fishing tool. Why? Because no other steel was immediately available. Otherwise you will gamble on the inferior steel, gamble your investment and all the steel used to drill it. Often you lose for want of 100 lb. of good steel—slowed down in your search for the oil we have got to have.

But you have many other problems. Your tool joints are not readily available, deliveries are running far behind requirements. The manufacturers are booked up months ahead and cannot make deliveries. N.E. steels, so far, seem to have been satisfactory when made into drill-pipe tool joints. The tool-joint problem as far as we know seems to be one of production.

Rock Bits

Rock bits, too, are not always readily available. Often many of you have run drag bits or fishtail bits while waiting on rock bits—or you have been shut down. This has resulted in inefficient costly hole making in your search for oil. Rock bit manufacturers are redesigning their bits to make the N.E. steels do as good a job as the S.A.E. steels. The designs are rather ingenious. A large manufacturer told me that he had no more complaints on bits made of N.E. steels than formerly. I told him that the drillers and contractors had not bothered to complain. They were telling the producing companies for whom they contract and in a rather emphatic way—to wit: more round trips—cones in the hole—can't get any footage, got to have more money per foot.

We have fished out quite a few cones and cutters lately. Another large manufacturer told me his records showed the new bits to be equally as good as the old bits. I invite you men to inform me on this question, for I have been a sucker or someone has the wrong dope.

Drill pipe, tool joints, rock bits and drill collars are major items critical to our operations. No hurry-up program of drilling for oil can be accomplished without these items. We can patch up draw works, we can use all kinds of substitute sizes and make of pumps, rotaries, etc. We can loan each other rig equipment, but we can't drill wells efficiently without good drill pipe, tool joints, rock bits and drill collars or under conditions as they exist today. I do not believe we can do too much fitting of this equip-

ment to current practice without an over-all slowing down and increased cost in the drilling program. There should be some relief for this situation.

Another element in our program heretofore taken for granted is our transportation. All of you men know the great expense and delays that we bear because trucks are not available. Time and again, you have been forced to take chances or run some faulty equipment simply because you could not obtain trucks or facilities to move the equipment. In spite of this, we are denied gasoline and tires for our trucks or rations are cut or something else happens. If the oil business is as essential as we are led to believe it is, or if we are to drill the wells we are asked to drill, we should have a green light on trucks for drilling operations.

It takes longer at present to move, to build derricks and to rig up than it should take to drill many wells. Valuable drilling days and subsequent producing days are lost by this slow uncertain transportation. Of course all of us are trying to keep contractors and company rigs busy without long moves, but this cannot be done in all cases. There is always a move from location to location requiring trucks. Many truck contractors won't haul for oil companies because in hauling on defense projects they can get tires, at least so they tell us.

Perhaps the biggest problem is labor. Whereas, in the past each of you could operate all your rigs, you are fortunate today if you can operate half or a fourth of your rigs. The same is true of all operators. The younger men are gone to the shipyards to do their bit, because they felt it was more patriotic to work in a defense job than to work in the oil business. The draft took great numbers of our most efficient men. The consequences has been a slowing up of work — fewer rigs, older, and in some instances incapacitated men. Contract laborers are not available to do the fill-in work—the young men are gone, the old men incapable.

Manpower

Many of the men would gladly come back to their old jobs if they could obtain releases. If the shipyards are overmanned and if the men want to come back and we need the oil, why not bring these things together and do the job as outlined by PAW. Probably in picking your personnel, you as contractors have the greatest responsibility and the greatest obligation to your operating company. We know you are desperate, that your labor turnover is high. We also know that you must keep your men while waiting on locations. Of all this, the companies are aware and you have no doubt found them cooperative. But you should select your men as carefully as possible, check their references as to experience where possible and instruct them carefully in taking care of your rig and the hole.

Now as I see the problem it is this:

The tool joint, rock bit, drill pipe, drill-collar manufacturers were forced to take on war work for several reasons. First, oil-field work was not granted adequate priority nor recognized as a critical industry on December 7, 1941, and for some time thereafter. Second, their organizations were about to disintegrate because of lack of work. Third, the country needed the production capacity for munitions; Fourth, their patriotism dictated that they make as great a contribution as possible. Fifth, shortage of trained personnel throughout the country caused them to accept the responsibility of building and managing additional plants needed in the war effort, which were subsequently built and manned by these manufacturers. Sixth, the uncertainty of the oil business—their bread and butter—and the war situation gave them little choice in the matter, but to do their utmost in aiding the war effort. Seventh, inventories for oil tools were good, further influencing them in their decision to seek war contracts.

War Contracts

In the meantime, war contracts were entered into with usual contractual obligations. Both parties entered into these contracts in good faith and subsequently the manufacturers have trained machine operators, built additional plants, manned them and have done an admirable job. However, because of the fact that these plants are manufacturing war munitions, means that they cannot supply the oil industry with the necessary rock bits, tool joints and drill collars. Until the war needs are met, these plants cannot make the deliveries to the oil country that are so badly needed. It is for the PAW or others to say and we are wondering if we have progressed to the position in our battle of production where these contracts could be relieved to such an extent as to free the necessary machines by transferring that part of the contract to other plants, thereby placing these machines on the production of oil tools. We of course have not the information nor insight to hazard a guess at the answer. We are also wondering if some of their better men loaned to other plants could not be returned to the oil-tool manufacturing plant. If this could be accomplished the oil industry would receive a great stimulus. At the present time, rock bit supply men are wearing out their trucks, running back and forth between the various rigs in their district and their warehouses. Economic stock placed at strategic points would greatly improve the rock bit manufacturing and supply companies field manpower problem, save many truck miles, tires and considerable gasoline. All of us have been promised deliveries of rock bits, tool joints, etc., which have not been met. This is often occasioned by the steel manufacturers not meeting their promised deliveries, which is to say that rock bits and tool-joint manufacturers are operating on raw-steel stock too small for efficient operation. I was told after first observing the raw-steel stock piles, that these plants are operating on 45-day stocks. Whereas larger raw-steel stocks would greatly facilitate their production schedules and assure all oil operators of a continuing supply of material. But until the demands of war effort have been fully met, these manufacturing plants must of necessity, continue to fulfill their war contracts to the very best of their ability and we as good American operators in the oil industry will have to do the best that we can.

The operators can be helpful and greatly facilitate production even now by cooperating to the extent of anticipating requirements of these critical items as far in advance as possible and placing orders as soon as possible after needs are determined. We can also be helpful by wholeheartedly accepting the simplified rock bit sizes, now being proposed by PAW and others. This simplification, I'm sure will meet with the same acceptance and success as the A.P.I. simplified casing program has already been accorded.

Under this program at least half the commonly stocked sizes will be eliminated and although you may have to use bits ⅛-in. smaller than you would normally use, you will be compensated by better service and stocks.

It is understood that the PAW is fully aware of this entire situation as outlined above and that they have promised relief. It is to be hoped that the promised relief will not be too long materializing. I sincerely trust that all of my remarks will be accepted in the spirit in which they are made—as a friendly and I hope constructive discussion of fitting drilling equipment and practice to present conditions.

BOOK REVIEW

CALIFORNIA MINERAL PRODUCTION, AND DIRECTORY OF MINERAL PRODUCERS FOR 1941. By Henry H. Symons. Published by Division of Mines, California State Department of Natural Resources. 377 pp.

This is the annual report of the statistics of the mineral production in California. The statistics are compiled for maximum use to producers and those interested in the utilization of the state's mineral products.

HAVE YOU HELPED AMERICA TODAY?

Here's How

To assure quick, safe unloading of Liquid Caustic Soda Shipments

Thanks to the splendid co-operation of consignees, railroads and shippers, a great wartime transportation record is in the making. As you know, *all* railroad cars are sorely needed. You can perform a genuine service for America by expediting the unloading of *all* shipments you receive—particularly where cars of special design are used, such as those required for Liquid Caustic Soda.

IMPORTANT

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Send for Free Instruction Card

To help remind handlers of Liquid Caustic Soda of the care necessary in unloading tank cars, a special instruction card has been prepared by Columbia. Posted in prominent locations, this 11" x 14" card will help to prevent accidents and errors which cause delays and disrupt your operations. Cards are yours for the asking, regardless of your Caustic Soda supply. Send for yours today.

Maintenance Where It's Most Important

Columbia's patented lining for tank cars is one of the important factors enabling the first successful and practical shipping of 73% Liquid Caustic Soda. That's why this lining is carefully checked and maintained in perfect condition at all times. Owing to the pressure of war work, the outward appearance of these cars occasionally suffers. But inside—where it really counts—Columbia tank cars are 100% efficient.

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SODA ASH · CAUSTIC SODA · LIQUID CHLORINE · SODIUM BICARBONATE · SILENE EF (Hydrated Calcium Silicate)
CALCIUM CHLORIDE · SODA BRIQUETTES · MODIFIED SODAS · CAUSTIC ASH · CALCIUM HYPOCHLORITE
PHOSFLAKE · CALCENE (Precipitated Calcium Carbonate)

Wartime Salvage and Repair Work Adds Much to Nation's Steel Supply

SALVAGING old and obsolete materials has long been practiced by Lion Oil Refining Co. in its operations as a worthwhile economy. With the War Production Board's first appeal early in 1942 for industrial scrap to back up production lines, Lion intensified its scrap collection program.

In collecting scrap the company attempts to make available for salvage all materials that have become obsolete or damaged and have no further immediate use. Scrap originates principally in the operating departments—refining, producing, pipe line and marketing. There are collection points at the refinery in El Dorado, at bulk plants in the marketing territory, at company production warehouses in Schuler and Smackover, Ark.; Wink, Tex.; Rodessa, La., and all other producing areas.

Facilities Installed

In the latter part of 1942, the company negotiated a contract with Defense Plant Corp. for the construction of a butadiene plant which is being built at the refinery site. This project involves the using of 80 per cent of salvaged material. To make this possible, the company erected a sizable building and installed the necessary facilities to rehabilitate all old machinery and equipment to be used in the construction and, also to make the necessary repairs to used materials that were purchased for the project. This salvage operation alone has enabled the company to reclaim tremendous quantities of valves, fittings, pipe, machinery, steel plate and all the other various items that were required in the construction of the plant.

Top: View of huge pile of scrap recently assembled at the Lion refinery's regular collection point for junked materials
Above: Reconditioned steel pipe on racks. This old pipe is located at the company's salvage yard at Smackover, Ark., after having been straightened, rethreaded and tested, and is now ready for use in the fields
Left: Filled to overflowing, this bin at the company tank-car repair shop near El Dorado, Ark., contains scrap ready for shipment to a junk dealer

At Smackover, the salvage yard is operated in connection with a machine shop. Much equipment for the

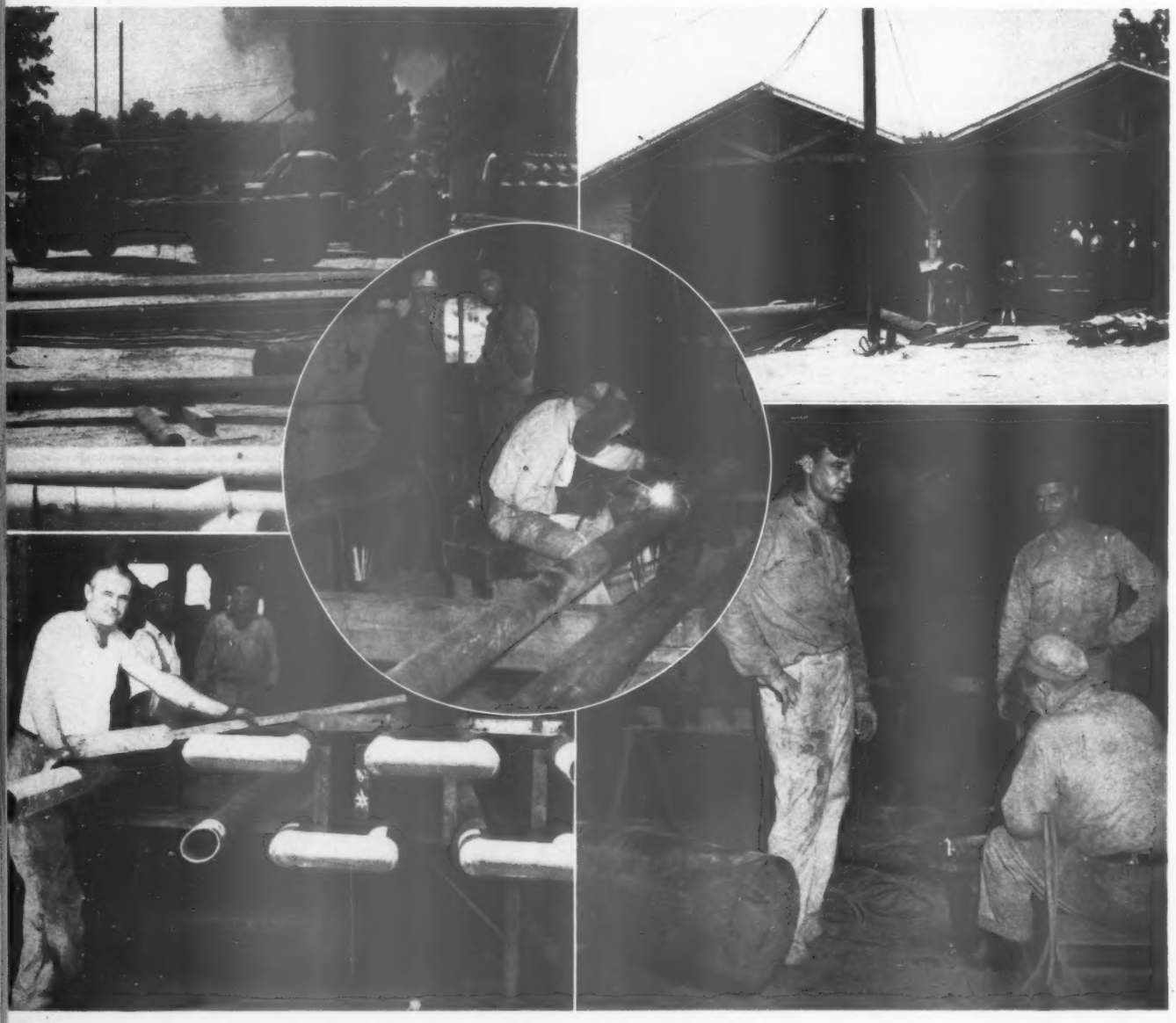
pipe-line and production departments has been fashioned out of scrap, and a great deal of old material is reconditioned. Pumps are made out of old working barrels. Valves are tested, repacked and fitted with new stems. Pipe is inspected, rethreaded and welded. All in all, several million pounds of pipe have been repaired here and put back into action. The reclaiming activities at this salvage center have furnished the company's producing operations with casing and tubing, formerly used in Smackover field. In the days before priorities, all steel tubing pulled from wells and showing signs of deterioration was scrapped. Now a testing apparatus is employed which accurately determines the condition of the steel; if the test proves it satisfactory, the tubing is used again in new wells.

Another department of the company which devotes itself largely to salvage operations is the refinery tank-car repair shop, whose responsibility it is to keep some 1,030 tank cars (both leased and company owned) in condition. Approximately 400 cars were made available for service in eastern United States where the petroleum shortage is so acute, a number having to be rebuilt to meet new government requirements.

The repair shop, which is completely equipped and staffed to do every kind of repair and maintenance work, performs miracles of rebuilding, even on badly damaged cars brought in from wrecks, and is able to put the greater per cent of these back into transportation again. The cost of these reconstructions would be deemed prohibitive in peacetime. Only the hopelessly wrecked cars are junked, from which usable parts are retained for repair work and the remaining portion sold to scrap dealers.

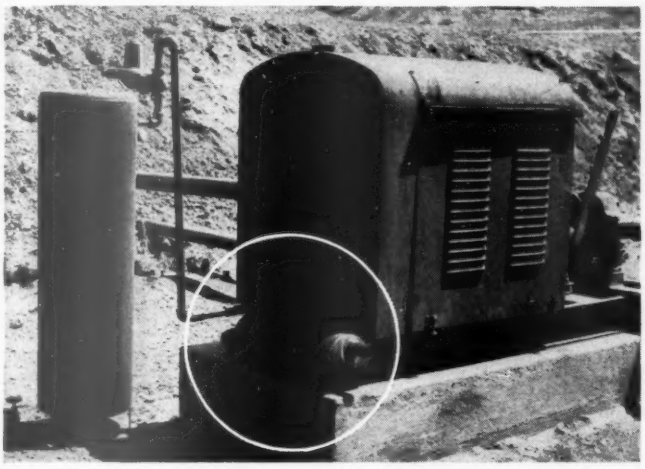
One of the big scrap "hauls" made by the company in 1942 resulted from the dismantling and selling of fourteen 55,000-bbl. steel storage tanks, which contained approximately 200,000 lb. of steel each, or a total of more than 2,500,000 lb. Steel from several other such tanks was dismantled and refabricated into vessels for the company's butadiene project. Since December 7, 1941, through June 1943, 6,597,800 lb. of scrap materials have been sold to dealers. More than 1,954,680 lb. have been sold in the first 6 months of 1943.

Views of machine shop on refinery grounds where scrap metal is reclaimed and salvaged. Exterior views show special machine shop for this purpose, and interior views show various operations in reclaiming metal and determining that which is to be scrapped



OPERATING IDEAS

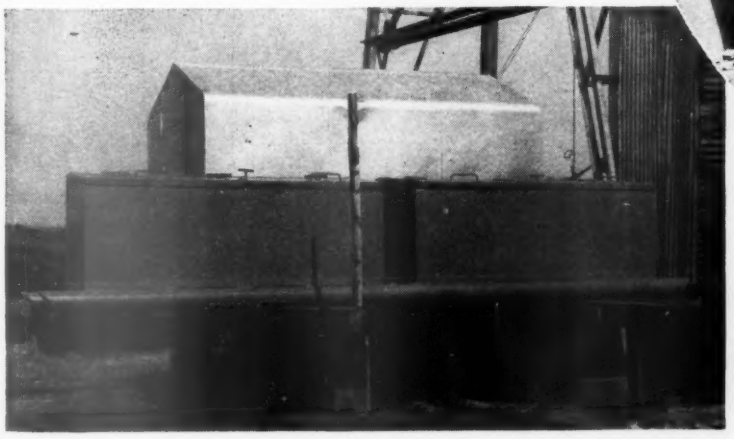
Gas Engine Muffler in Horizontal Position

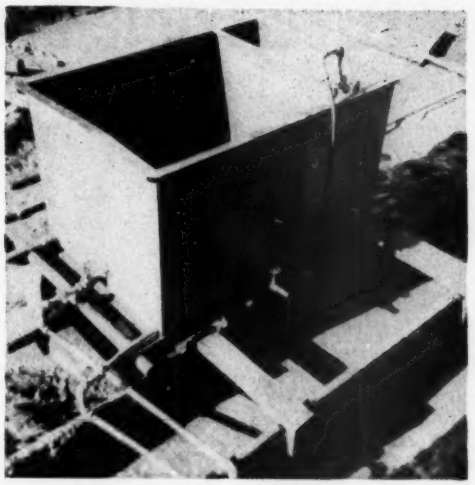


PLACING the engine muffler in a horizontal position offers several advantages over the vertical, among which is preventing rain from entering the tail pipe, but the greatest benefit a large producing company observed was the absence of fatigue in the exhaust pipe and engine manifold. When changing the position of the muffler from vertical to horizontal, and then laying it down on the engine block, the exhaust pipe must, obviously, be tailored to fit the individual unit. The exhaust pipe, connected in the usual manner to the manifold of the engine, is formed of adequate-size pipe shaped to pass from the engine beneath the hood louvre panel at an angle so that the muffler will lay in front of and beneath the radiator. If there seems to be a tendency for the muffler to creep, a clamp can be bolted to the engine skid base and around the body of the muffler itself.

Double Tool-Box Skid

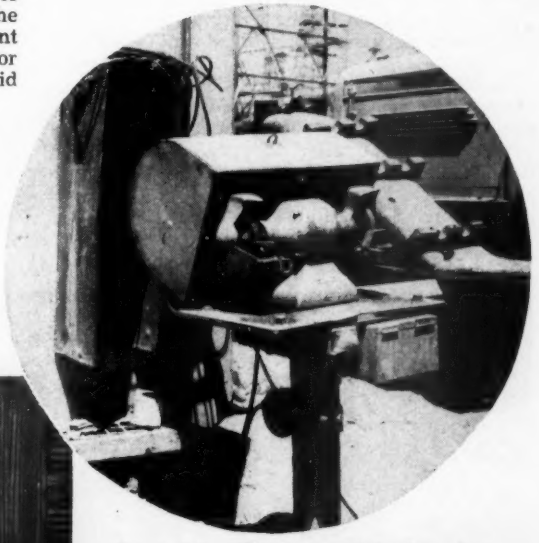
TOOL-BOX capacity is never excessive around a drilling rig and using individual tool boxes generally results in their being damaged during moving. One contractor operating in Oklahoma simplifies the problem by mounting two tool boxes on a single skid made from 5⅝-in. drill pipe. This makes too large a unit to be handled carelessly but it can be easily loaded on the bed of a truck.





Vat for Mud Chemicals

CHEMICAL treatment of drilling fluid is particularly necessary on deep wells and on wells in areas where the viscosity of the mud tends to rise. This steel vat not only provides ease of mixing the chemicals but also permits ready adjustment of quantities of the solutions being added to the mud stream. The tank has two compartments, a large one and a small one. Each compartment is provided with an outlet and a needle valve for controlling flow from the tank. Steam and water connections to the compartments aid in mixing the chemicals. When moving, the tank can be used as a storage space for light wire, etc.



Portable Electric Grinder for Drilling Rig

KEEPING hand tools sharp and in working condition can be done easily by men on the rig when a portable electric grinder is supplied as part of the drilling equipment. Here it is mounted on a standard having a base which permits setting on the ground at any point near the rig where current may be obtained.

First Triple-Zone Completion in Texas Successfully Made in Lake Creek Field

by E. H. Short, Jr.

THE first triple-zone completion in Texas was made recently by the Superior Oil Co. at its 5 McWhorter in the Lake Creek field, located in Montgomery County, Texas.

The three zones which may be produced simultaneously from this well are in the Eocene-Wilcox horizon and have been designated as zones A, B and D. Pertinent data pertaining to these zones are shown below:

			Production		
Zone	Top (ft.)	Thickness (ft.)	Type	Potential open flow (M.c.f.)	B.h.p. (lb. per sq. in.)
A	9,218	64	Distillate	3,460	3,900
B	9,744	35	Distillate	5,600	4,300
D	10,220	70	Distillate	5,100	4,650

While this well has been producing from all three zones, it is planned to use the lower zone as a gas-injection zone, while producing from the upper two zones. The surface hookup, O-C-T well head and meter connections are shown in the accompanying photographs. A diagram of the subsurface equipment as installed is shown in Fig. 1.

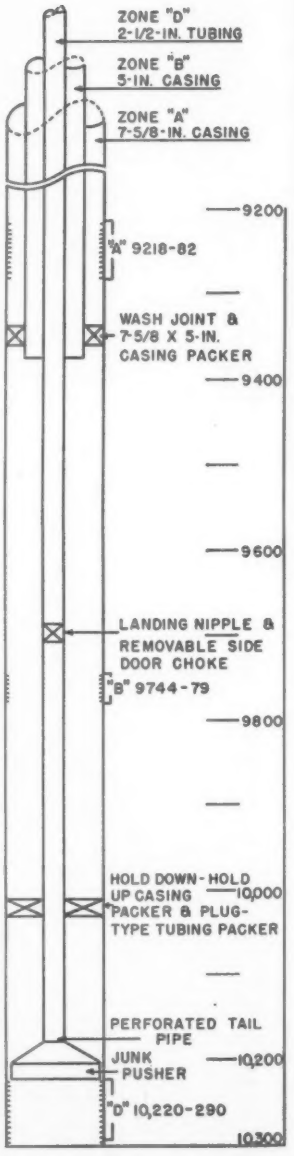
In completing the well the 7⅝-in. casing was set and perforated opposite the three pay zones, and the usual tests made after the perforation of each zone. The operational steps involved in making the triple completion were as follows:

1. A 7⅝-in. dual-completion packer

Below: Fig. 1, showing diagram of the three-zone completion

Left: Well-head view of first triple-zone completion

Bottom, left: Meter installations from Zones A, B and C



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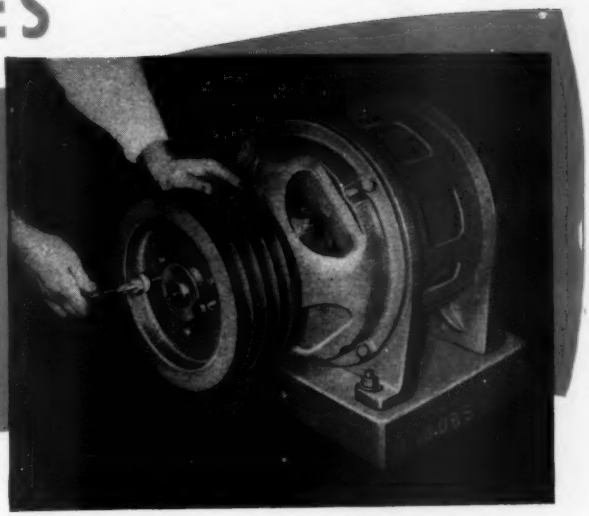
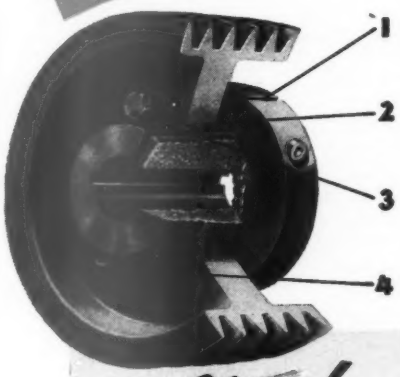
EASY TO GET OFF!





——YET ALWAYS TIGHT ON THE SHAFT

"EASY TO GET ON! EASY TO GET OFF!—YET ALWAYS TIGHT ON THE SHAFT" is a fact that can be proved by one demonstration of the QD sheave principle.

THE QD SHEAVE IS EASY TO INSTALL OR REMOVE because the QD patented design incorporates a split hub positioned on the shaft with a single cap screw. The rim is pulled up on a tapered fit with the hub by pull-up bolts.

THE QD SHEAVE IS ALWAYS TIGHT ON THE SHAFT because the pull-up bolts exert positive pressure on the tapered rim against the tapered split hub, providing a metal to metal fit.

Note!

1. SPLIT HUB for easy mounting or removal from the shaft.
2. TAPERED FIT between split hub and rim for easy mounting or removal of rim from hub.
3. PULL-UP BOLTS which pull the rim onto tapered split hub for tapered friction drive assembly and positive press fit on the shaft.
4. TAPPED HOLES IN RIM for using pull-up bolts as jack screws to free the tapered friction fit when detaching the rim.

MULTI-V-DRIVE

Dealers everywhere are demonstrating to their customers the time-saving, labor-saving and material-saving advantages of the QD (Quick Detachable) SHEAVE.

MEMBER MULTIPLE V-BELT DRIVE ASS'N

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COMPLETE DRIVES

WORTHINGTON MULTI-V-DRIVES

SHEAVES OR BELTS ONLY

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Communications
AS MODERN AS AT HOME
At war, code messages flash between advanced posts and control centers. For speed and accuracy, teletypes are used, their vital electric power supplied by gasoline engine-driven generators. Another of the hundreds of uses for the hundreds of thousands of dependable Briggs & Stratton 4-cycle, air-cooled gasoline engines now serving our armed forces.
Our experience gained in meeting new production highs—and, at the same time, constantly maintaining Briggs & Stratton standards for precision, quality, durability and economy—will be equally important and advantageous when we again resume peacetime production.
Our customers, and the owners and users of Briggs & Stratton gasoline engines, will find an even "improved" service and a "better" product, to maintain our recognized position as builders of "the world's finest air-cooled gasoline engines."
Can we help you now, on present wartime needs, or post-war planning?
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ENLIST YOUR DOLLARS
BUY WAR BONDS
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GASOLINE ENGINES

with junk pusher at lower end was installed in the casing above zone D.

2. A 5-in. by 7⅝-in. packer with circulation port above was installed a short distance below zone A. This horizon was then washed in with water through circulating port in the wash joint. Gas was then injected down the 5-in. casing and the water flowed up through the annular space between the 7⅝-in. and 5-in. casing.

(a) Wash joint port was then closed in the 5-in. and the upper sand allowed to clear itself.

3. The 2½-in. tubing was set in the 7⅝-in. packer on bottom with the tubing side-door port open. A swab was run down to the choke (choke will not permit swab to go lower) and the tubing swabbed in order to bring in zones B and D.

(a) Side-door choke closed to separate middle and lower formations. Each zone was tested thoroughly before the next zone was brought in.

While this well was successfully completed to permit simultaneous flow from the zones without commingling of fluids, a job of this nature requires considerably more time and technique than is indicated by the foregoing operational steps.

From an economic aspect, a triple completion represents a substantial saving when the cost of drilling two wells and dually completing one of them is considered. Then too, there is an indicated saving of approximately 250 tons of pipe. A triple completion, however, calls for the installation of a large amount of subsurface equipment, and the success of the work is dependent not only upon a precise installation procedure, but also upon the subsequent perfect functioning of the equipment under high operating pressures.

Therefore, while the economic possibilities are quite attractive, it appears that a more general application will depend largely upon the installation technique developed during the first few jobs.

Texas University Will Offer 32,000 Acres at Auction

AUSTIN, Tex.—A special sale of oil and gas leases at public auction will be held by University of Texas, offering about 32,000 acres of leases, on December 3. Featured will be tracts in University Block 13, Andrews County, southeast of the Fullerton pool which has its best potential producers on the southeast side, adjoining or on University land. Highest individual price ever paid for University leases were paid for tracts in this area, $189,000 being paid for one tract of 320 acres and $99,000 being paid for one tract of 160 acres. The Fullerton pool produces from the Clear Fork lime of the Permian at about 7,000 ft.

Drop that extinguisher!

. . . unless you want to burn down the plant

The man who hits flaming oil with a soda-acid fire extinguisher is heading for trouble. He is using a good fire-fighter in the wrong spot. Soda-acid units are for "Class A" blazes, never for flammable liquids.

It's no good to have fire extinguishers, if your men don't know how to use them. *The wrong extinguisher may be more dangerous than no extinguisher at all!*

It is fortunate that the facts about fire extinguishers are easily understood, if correctly taught. Best way to teach them is by *demonstrating*. Show your own extinguishers in action against real fires. Do it at your plant.

"How To Teach Fire Fighting" has been prepared by Walter Kidde & Company to show you how your plant can handle fire-instruction. This illustrated book explains all classes of fires—tells you how to fight each successfully. You'll want a copy, free. Write Walter Kidde & Company, Inc., 1039 Main Street, Belleville, N. J.

QUESTIONS on TECHNOLOGY

by W. L. Nelson

Surface Tension of Ethanolamines

Where can we obtain the surface tension of monoethanolamine?—C. R.

The best general information about such special properties is the International Critical Tables, which can be obtained at most university or college libraries and in first-class city libraries. Surface tension data are not, however, plentiful and hence, the manufacturers of the ethanolamines (such as Carbide & Carbon Chemicals Corp., 30 East Forty-second Street, New York) should be consulted. They will gladly furnish such information.

Evaluation of Kerosene In Crude Oil

I have seen your answer to my question about the kerosene content of crude oil in the September 9 issue of The Oil and Gas Journal. Will you please give a real example so that we can do it to our oil?—L. F.

The answer on page 70 of the September 9 issue was not too complete, but it will be necessary to refer to the information given in that discussion in order to understand the discussion here.

Consider the curves of a paraffin intermediate base (mixed or Mid-Continent) crude oil shown on this page. A true boiling-point distillation and a mid-per-cent-gravity curve are shown (Fig. 1). This crude oil will yield kerosene in the higher gravity ranges of 41 to 46. At 43 per cent in the crude oil is a small amount of material having a gravity of 42 A.P.I. Thus, a yield of 2 per cent from 42 to 44 per cent on crude oil will have a gravity of 42, and likewise a fraction of 20 per cent extending from 33 to 53 per cent will have a gravity of 42 A.P.I. From this it is apparent that a large number of different fractions each of a different percentage, but all having gravities of 42, can be produced. However, extremely large yields cannot be produced because they would contain so much low-boiling material that their flash points would be too low. Thus, a 42 A.P.I. kerosene extending from 18 per cent to 68 per cent (a 50 per cent yield) would have a very low flash point, perhaps lower than 108° F.

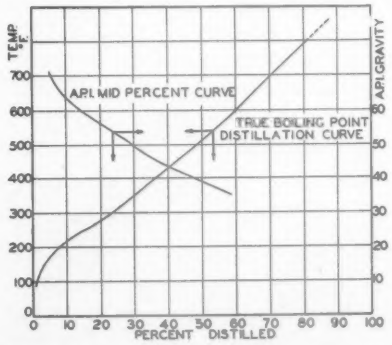

Fig. 1: True boiling point and gravity mid per cent curves of a paraffin intermediate base crude oil

Reference should be made to the curves of flash point as a function of true boiling point shown on page 70 of the September 9 issue of The Oil and Gas Journal, and to general methods of crude oil evaluation discussed in Chapter 7 in the second edition of Petroleum Refinery Engineering, McGraw-Hill Book Co., Inc., New York, 1941. According to these references, when a gasoline cut of 30 per cent is made (348 T.B.P. cut point) the flash points of the kerosenes starting at 30 per cent will range from about 130° to 160° F. depending upon the yields made. Thus, a 10 per cent yield (30-40 per cent on crude) would have a flash point of 134° F., and it would have a gravity of 46 A.P.I. The gravity was read at 35 per cent on crude oil—the mid-percentage point of the fraction. In a similar manner the flash points and gravities of various kerosenes each starting at 30 per cent are somewhat as follows:

Per cent yield	Per cent range	Flash point °F.	Per cent mid-point	A.P.I. gravity
10	30-40	134	35.0	46.0
15	30-45	145	37.5	44.8
20	30-50	155	40 0	43.4
30	30-60	163	45.0	41.0

The approximate A.S.T.M. end point of the 30 per cent of gasoline would be about 340° F. (see Petroleum Refinery Engineering, page 87). It must be recalled at all times that similar yields of kerosene can be made but having lower flash points, by conducting a poor separation in the topping plant—and this is the common practice unless large yields of kerosene are desired.

Similar data on the yields of kerosene that are possible, but when making gasolines of various end points are shown in the following table:

YIELDS OF KEROSENES FOR VARIOUS AMOUNTS OF GASOLINE

	340 e.p. gaso. (30%)		383 e.p. gaso. (36.5%)		405 e.p. gaso. (39.6%)	
Yield of kerosene	Flash point of kerosene	A.P.I. of kerosene	Flash point of kerosene	A.P.I. of kerosene	Flash point of kerosene	A.P.I. of kerosene
10	134	46.0	158	42.8	169	41.0
15	145	44.8	172	41.7	185	(40.0)
20	155	43.4	...	...	...	...
30	163	41.0	...	...	...	...

The A.S.T.M. distillation curves of the kerosenes are also of interest. The best way to obtain such curves is to produce the kerosenes in the laboratory, but it is sometimes useful to be able to estimate the A.S.T.M. distillation curve. This can be done by means of the relationship shown on Fig. 81, page 253 of Petroleum Refinery Engineering. Such curves were estimated as shown in Fig. 2 on this page for the four kerosenes (10 to 30 per cent yields) when making a 340 e.p. gasoline.

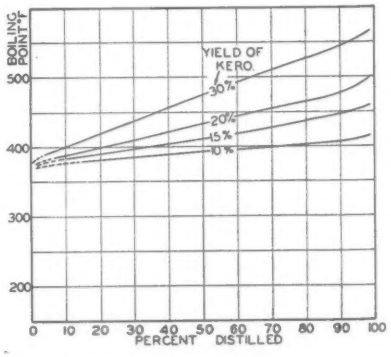

Fig. 2: Estimated A.S.T.M. distillation curves of well-fractionated kerosenes when making a 340-e.p. (30 per cent) gasoline

B&W ALLOY CASTINGS

Here we see the typical output of a B&W foundry where alloys are formulated, tested and cast for the wide variety of process equipment produced by Babcock & Wilcox. The foundry includes electric induction furnaces, heat-treating equipment, electric welding apparatus and X-ray inspection machines. In this foundry alloy castings in almost any shape and weight can be poured.

Some of the castings produced here are Oil Still Tube Supports, Soot Blower Elements, Heat-treating Furnace Parts, Lead-melting Wire Annealing Pots, Cement Mill Castings, Paper Mill and Chemical Plant Castings, Boiler Castings, Tube Supports, Baffles, Impellers, Oil Burner Nozzles and Rolling Mill Plugs.

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"The life and soul of science is its practical application."
—Lord Kelvin

1820-1872
William John MacQuorn Rankine was the pioneer of the modern science of thermodynamics on the bases established by Carnot and Joule. He was the author of the first formal treatise on the subject.

Rankine also developed a practical formula for the calculation of the efficient utilization of the latent heat of vaporization. Rankine was also an engineer and understood the practical application of his physical research.

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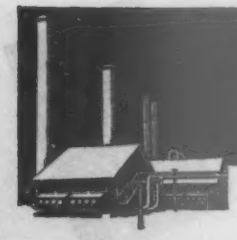

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Effect of Sulfur in Crude on Refinery Operations

(Continued from page 64)

have been developed that remove all or portions of these sulfur compounds. Sulfur extraction processes can be listed as follows:

1. Caustic scrubbing; (2) caustic scrubbing plus some type of activator to improve the efficiency of caustic scrubbing; (3) sulfuric acid; (4) removal of disulfide by redistillation.

Fig. 4 has been so drawn as to

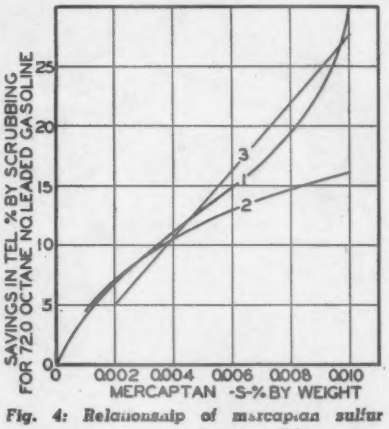

Fig. 4: Relationship of mercaptan sulfur content to octane number and TEL savings

emphasize the importance of removal of mercaptan sulfur compounds from gasoline. Notice that there are three curves representing three different sets of data. A variation in the petroleum products tested should cause a definite variation in the effect of small amounts of mercaptans. We believe there is a definite difference between the three curves and that the composite data are very useful in estimating the value to the refiner of any of the sulfur extraction processes.

Straight caustic scrubbing of West Texas gasolines is very effective. Caustic scrubbing by the use of special activating agents, such as potassium isobytrate or methanol, have been thoroughly described in literature.[31,32] Also, sulfuric acid is very effective with West Texas gasolines. Incidentally, sulfuric acid has a very complex action upon petroleum distillates, depending upon the strength of the acid and the quantity present. It actually has a sweetening action in some respects, changing mercaptans to disulfides. However, there are many other actions such as re-solutions of these disulfides and polymerization, which together give effective treatment. Sulfuric acid treatment has been covered in detail by Waite and Aitken[33] in recent literature.

Vapor Phase Treating

One of the most efficient methods

of treating high-sulfur distillates is by one of the many vapor phase treatments using fuller's earth, clay or bauxite as a catalyst. Most of these processes are accomplished at temperatures above 650° F. These vapor phase processes are known by various trade names such as "Gray process,"[17] "Perco process,"[18] and "Houdry."[19] One West Texas refiner reduces straightrun gasoline from a sulfur content of 0.2 per cent to below 0.05 per cent by using a West Texas clay as a catalytic agent.[20] The removal of sulfur by one of these methods usually increases the clear octane number by at least two points. There is also a definite increase in lead susceptibility that gives another increase from four to six points in octane, depending upon the quantity of tetraethyl lead used.

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Sour-Crude Refining Is Problem of W.P.R.A.

INTEREST in the problems involved in refining sour crudes was evidenced in the questions asked by 135 technical and operating men following the presentation of the paper on that subject by George H. Burruss and B. I. Scoggin, of Anderson-Prichard Refining Corp. The paper was presented October 12 at Tulsa under the sponsorship of the Western Petroleum Refiners Association.

Interest in this subject is heightened by the repeated statements of PAW officials and others that larger quantities of sour crudes, especially those from West Texas, must be processed by refiners if demands for petroleum products are to be met during the next 15 months. With a total increase in refining capacity of 260,000 bbl. by late 1944, and with 440,000 bbl. more capacity at present than is being utilized, but with a shortage of capacity which is equipped to run sour crudes, it will be necessary to reequip some refining capacity to permit economical operations. This will probably be done by allocating alloy steel for tubes, lines and liners, for some plants running sour crude but not properly supplied with corrosion-resistant alloys for the purpose.

The paper as presented by Mr. Scoggin at this meeting starts on page 61 of this issue. In answer to questions the speaker emphasized that little if any corrosion appears in the atmospheric distillation part of the refinery, and that serious corrosion occurs in cracking or wherever high-sulfur crude is heated above about 675° F. Alloys are the only real protection from this "hot corrosion," chemical treatment being inadequate, the authors mentioned. Chemical treatment of sour-crude fractions varies in intensity with the amount and kind of sulfur compounds present, but is generally twice to three times as expensive as is handling and treating sweet crudes. Maintenance costs are three times as high or higher with sour crudes. Operating costs are also increased, because of the need for greater and more exact control work required.

It was stated during the meeting that straightrun gasoline from these West Texas crudes will show octane numbers of 91 or higher with 4 cc. of TEL, and thus some are satisfactory for use in base stocks for superfuels. The sulfur present in either straightrun or cracked gasolines lowers both the "clear" octane number and the TEL susceptibility of the product. Desulfurization increases the octane number one or two units; TEL susceptibility is increased from 8 to 12 units depending on the individual product tested. Diesel fuels from these crudes show about 45-cetane number, and comply with the military "X" specification which is for low-pour-point diesel fuels, with 45-cetane number; generally they do not meet the "B" specification which requires 50-cetane number minimum.

Considering the economics of the situation, an independent refiner executive stated that, if West Texas crude, because of the additional transportation costs, were laid down for the Mid-Continent refiner at as high a price as is sweet Oklahoma crude, then the refiner must make up "$50,000 to $100,000 each" in some manner in order to operate economically on this crude. This executive wondered just how the small independent will be able to make up this deficit, with no satisfactory answer being offered. Neither were any refiners present able to answer the query as to how large a percentage of sour crude can be mixed with sweet crude without impairing seriously the qualities of the sweet crude.

Operating Features of Project Five

(Continued from page 60)

when discharge pressure rises excessively. Plans for Project Five did not call for automatic warning horns.

Relief valves have been installed at all stations to protect pumping equipment, in case of emergency shutdowns. Check valves are installed at receiving manifolds. Venturi type meters are installed at the three centrifugal pump stations.

At the Warren station a 10,000-bbl. tank has been installed. Star City and DeWitt stations each has a 3,000-bbl. tank. Normally they are seldom used for holding slop. A feature of these tanks is provision for pumping out contents as completely as possible. For this purpose concrete has been put in the bottom; the surface of the concrete slopes from a height of 6 in. at the tank wall to the floor of the tank near a point where sufficient space has been given for operation of a suction line and a bleeder line. The suction line penetrates the tank wall above the concrete and terminates at the sump-like space, at a point 3 in. from the bottom of the tank. A nearby bleeder line, the suction end of which is 1½ in. from the bottom, extends to a small pump.

At El Dorado there are four 80,000-bbl. and two 50,000-bbl. tanks in addition to two 55,000-bbl. tanks utilized by Gulf Refining Co. for heating oil.

The Helena terminal is equipped

with two separate piping systems for segregating heating oil and gasoline moved in and out of the nine 80,000-bbl. tanks.

Project Five has operated for nearly a year without putting an inhibitor in the fluid transported and without the installation of filter units or "hay tanks" both of which are found on most products lines.

Suspended matter, referred to as scale on Project Five, is removed from the fluid in scale traps. These are being installed at all stations. A scale trap provides for retarding velocity of fluid sufficiently to permit scale to settle. The principal features of the trap at El Dorado are two headers, 20 ft. long. From a 30-in-diameter header, settlings drop through connections to a 14-in. diameter header from which drainage goes to the scale pit. These scale traps are made at the Gulf shops at Beaumont, Tex.

Pump packing has been giving much better service ever since the first scale traps were installed after several months' operation without them. It has been estimated that scale traps eliminate 75 per cent of packing trouble.

Scale trouble on Project Five is said to have been considerably aggravated by conditions existing because the line consists of old pipe.

Internal corrosion in the line has been combated by special care in removing water from the bottom of tanks holding refined products before shipment through the line.

In the early stages of operating the system, scrapers were run to separate batches or blocks, as they are called on Project Five. But this practice was discontinued. The current practice is to run knife scrapers through the line about once a week for cleaning purposes only.

For the various companies using the line, three grades are handled: furnace oil, known as No. 2 heating oil; house brand gasoline and premium gasoline. Blocks of 70,000 to 300,000 bbl. are customarily handled, although occasionally they may be as small as 30,000 bbl. Daily capacities are regarded to be as follows: Furnace oil, 46,000 bbl.; gasoline, 56,000 bbl. However, it has not been uncommon to have daily shipments at the rate of 49,000 bbl. of furnace oil and 58,000 bbl. of gasoline.

As would be expected, special attention is given to avoiding contamination of furnace oil. Large blocks can be moved steadily at sufficiently high pressures so that satisfactory flash points may be maintained. The terrain is regarded as favorable for products line operation.

At El Dorado and Helena, gravinometers have been installed for accurate determination of points of contact between blocks of different grades.

Shipments go from the Helena terminal by tank car but mostly by barge. The line saves a 15-day barge trip to Helena and that barges take 37 days for the 1,290-mile trip from Helena to Pittsburgh. During the first 6 months of operating the line, it was shut down three times by unfavorable river conditions which resulted in irregular arrival of barges at Helena.

Affairs of Project Five Pipe Line Corp. are directed by E. C. Kincade, president of the company and also vice president of Gulf Refining Co. Other men of the Gulf organization who are concerned with the project are: C. M. Rosebrugh, chief engineer; F. C. VanCleave, division superintendent, who serves as superintendent of Project Five. J. S. Fowler is foreman at El Dorado.

Much attention has been directed to a peculiar occurrence during the late spring flood of the Arkansas River which broke the War Emergency Pipelines, Inc.'s 24-in. crude-oil line near Little Rock, Ark. After the flood subsided, measurements showed that a bank of the Arkansas River at the Project Five crossing, near Goulds, Ark., had been cut back 625 ft. and the line had moved a considerable distance down stream. Large trees and timber catching on the line formed a mat on which sand accumulated which furnished protection which prevented damage from the force of the current.

Rack Designed for Storage of Plate-Type Equipment

A RACK has been devised for convenient storage of drilling templates for exchanger tube sheets, or circular or other type plate equipment. Horizontal channels of 8 in. or more and of the desired length comprise the base. Lengths of ⅜-in. diameter steel rod or castoff pipe are used to form the dividers. The main channel section is attached to the several shorter sections at distances determined by the size of the disks or headers to be stored, the distance between the beams being somewhat greater than the radius of the headers in each case. Holes are drilled through both flanges of each channel slightly larger than the diameter of the rod or pipe used. Rod or pipe sections are bent into smooth curves and the ends passed through the holes in the channel flanges to form a series of slots. The rod or pipe curves should extend to a height greater than the radius of the disk handled. Templates, for example, for heat-exchanger headers may be placed in these slots, their identifying numbers up or in sight, for storage until needed to make a new header sheet.

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

COST OF PROTECTIVE COATING AT LEASE TANKS VERSUS REPLACEMENT

APPLICATION of protective coatings to steel lease tanks is receiving increased attention on the part of many operators. Besides the purely economic aspects of the subject, the present unavailability of sheet steel for other than essential wartime needs is an added incentive to protect all steel tankage now in use.

The economic advisability of coating small lease tanks has always been a controversal subject. However, at the present time, many operators have found it necessary to repair and coat old tanks which in normal periods would be junked.

In general, steel receiving and stock tanks are coated over the entire interior surface only in those areas where severe corrosion occurs. Many operators have adopted a policy of coating steel tank bottoms in all instances and apply protective coatings on tank shells and the undersides of the deck only where necessary.

TABLE NO. 1

New Steel Tank:

Cost of new 250-bbl. steel tank	$700
Labor and miscellaneous material to install tank	200
Total cost of new steel tank in place	$900

Cost of Protective Coating:

Labor to clean tank	$ 35
Sandblast interior surface of tank	30
Labor and material to coat entire interior surface of tank	250
Total cost of protective coating	$315

Average Life of Tanks

A graph, representing the average life of steel tanks in five different producing areas is shown in Fig. 1. Similar information is usually available in the files of any company. It will be noted that the areas labeled "D" and "E," are severely corrosive, the average life of steel tanks in these localities being less than 3 years. Data concerning the unit cost of new steel tanks, as well as the cost of applying a protective coating to used tanks, is shown in Table 1. These costs vary considerably, according to the size and type of tank; however, such cost data to fit individual cases are usually available to any operator.

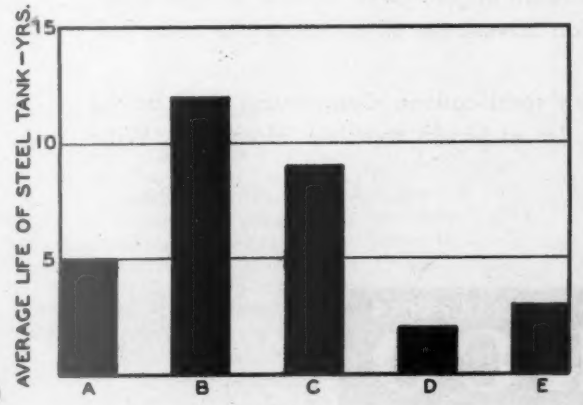

Fig. 1

Assuming that the tank coating would afford adequate protection for 2 years it would be advisable to coat all tanks in the areas "D" and "E," Fig. 1. A decision to coat the tanks in other areas, however, would depend to a large extent on the life of the protective coating.

Other Factors Involved

Factors which should be considered are: type of oil or fluid which the tank must handle, average life of steel tanks without protective coating, life of the protective coating, type of corrosion and comparative cost data on installation of new tanks with cost of repairing used tanks.

In many instances, the oil going to stock tanks is relatively free of water and only the tank bottoms and lower 6 or 8 in. of the shell are exposed to corrosive action. Consequently it might be advisable to coat only the tank bottoms. In "sour" crude areas, however, condensation of water on the underside of the roof, together with the hydrogen sulfide gas usually results in rapid failure of this portion of the tank.

Many different types of protective coatings are available for use in steel tanks. There are usually either bituminous materials or some type of plastic resin coating. Recently, cement lining applied by a special process, has been used for oil field tanks. Operators usually agree that protective coatings have definite limitations and will afford adequate protection for only a limited period of time.

However, in many instances, protective coatings on steel lease tanks afford major opportunities for reduction of operating expense.

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Engineering Fundamentals

No. 110

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

CAUSES OF CROOKED HOLES

EXCEPT in those special cases where oil wells are intentionally drilled off vertical, it is desirable that the course of the bore-hole be kept vertical within very close limits. In fact, it is generally desirable that a well not deviate from vertical by more than 3° unless an inclined hole is being intentionally drilled.

For several years after the advent of the rotary rig little regard was paid to the verticality of the drill hole, and as a result many wells were completed and produced for many years that were later found to deviate from vertical by large amounts. Cases are on record of wells found to deviate from vertical by more than 45°. In the Seminole field two wells, located 660 ft. apart at the surface ran together at a depth of 1,900 ft.*

Because of difficulties involved in completing wells with crooked holes, as well as permanent difficulties encountered in producing such wells, engineers began some 20 years ago to make a study of the causes of crooked holes and the possible means by which a well might be drilled with rotary tools and kept on an approximately vertical course. Deviation instruments† were developed for checking the verticality of wells, and correct drilling technique was evolved for preventing appreciable deviation from vertical.

Experience has shown that the greatest single cause of crooked holes in rotary drilling is excessive weight on the bit. However, there are other influencing factors which have some effect and which must be considered in determining just what constitutes "excessive weight" in any particular instance. The weight on the bit becomes excessive when it is sufficiently great to cause the drill pipe to flex or buckle under compression. This condition is illustrated in Fig. 1.‡

In Fig. 1-A, the drill pipe (a) is in tension. All of the weight carried on the bit is in the drill collar (b). Under this condition, the drill string is analogous to a plumb bob; the drill pipe acting as a supporting member or string, the drill collar and bit corresponding to the bob or weight. Due to the stiffness of the drill collar, it will not bend under the weight carried on the bit. So, the drill pipe should swing in a vertical position and drill a vertical hole as illustrated in Fig. 1-A, as long as the weight on the bit is kept appreciably below the weight of the drill collar. Fig. 1-B illustrates the condition that may exist if excessive weight is applied to the bit. Here the plumb bob effect of the drill string is destroyed since the lower portion of the drill pipe (below point c) is in compression. The compression causes flexure of the drill pipe which tips the drill collar and bit and deflects the course of the hole from vertical.

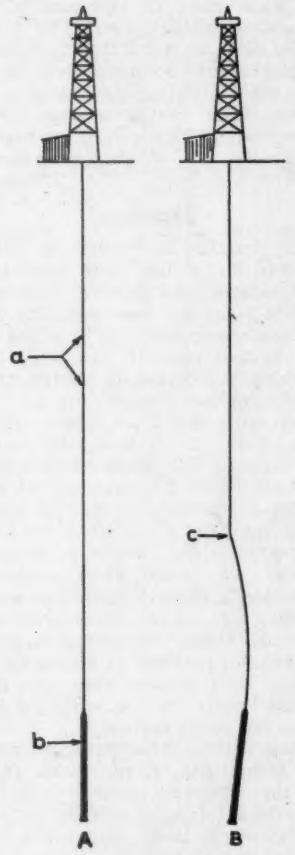


Fig. 1

A high rate of drilling-mud circulation is another factor which may, under certain circumstances, cause a bit to be deflected from a vertical course. An excessively high rate of mud circulation may, in certain types of formations, cause a cavity to be washed out ahead of the bit by the high-pressure jets from the bit ports. As a result the bit deviates from a vertical course by following the line of least resistance. This condition is illustrated in Fig. 2. Here again, weight on the bit is an interrelated factor, since reduction in the weight carried on the bit would aid in reducing the amount of deviation resulting from such a jetting effect. Reduction in the pumping rate, however, is the best remedy for this condition.

Improper alignment of the drill string in starting a well, although slight, may result in increased deviation with depth. For a given weight on the bit, the drill stem will flex more easily if the hole is already a little off vertical than if the pipe is in a true vertical position. This additional flexing causes the hole to depart from vertical at a constantly increasing angle. Reduction in weight carried on the bit will allow the hole to finally assume a vertical course, but it is much more desirable to start the hole vertically at the beginning.

There have been in the past some bits introduced on the market which were found, because of some design feature, to result in a tendency to deviate from a vertical course. Such bits have been redesigned or removed from the market because of this weakness. At least, bit manufacturers must take this factor into consideration and avoid any design that would result in such a tendency.

When a bit becomes worn or out of gage, the likelihood of drilling a crooked hole is increased. The driller tends to add more weight in order to make better progress, which may cause flexing of the drill string and resultant deviation from vertical. This

*Reported by John R. Suman in "Elements of Petroleum Industry," A.I.M.E., 1940, p. 161.

†These instruments will be discussed later in this series.

‡After Robinson, "Controlled Vertical Drilling Methods," Technical Oil Tool Corp., Ltd., 1939.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

is particularly true when the bit encounters a hard streak immediately underlying a relatively soft formation. A dull bit tends to slide around on such hard material before "biting into it." Finally when the bit does begin to penetrate the hard streak its path may be somewhat off-center with the axis of the hole above that point.

Use of drill collars of sufficient length and diameter are of prime importance in maintaining a straight hole. It may be said that a rotary drill collar performs a three-fold purpose in maintaining a straight hole:: (1) It provides the necessary weight to be placed on the bit, (2) due to its thick walls, it provides stiffness in that section of the drill string that is under compression, and thus prevents buckling, (3) due to its large diameter (only slightly less than that of the hole cut by the bit), it forms a guide to keep the bit in alignment with the hole already drilled. A good rule to follow is to provide enough drill collar that its weight is somewhat in excess of the maximum weight that is to be placed on the bit. In this way, all of the drill pipe above the drill collar is kept in tension and the tendency to buckle is eliminated.

*J. E. Brantly, "Rotary Drilling Handbook." Los Angeles and New York, 1936.

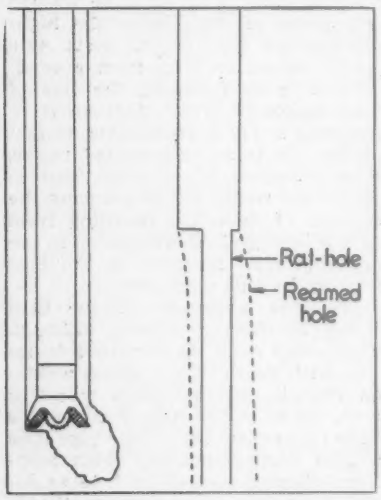


Fig. 2

Fig. 3

Brantly* states that at least 40 ft. of drill collar should be used under any circumstances and that proper length for general service is about 120 ft. He believes that no more than 200 ft. of drill collar is needed in the most extreme cases. He recommends that in ordinary flat-lying formations, not more than 75 per cent of the drill-collar weight should be placed on the bit, and states that it is better practice to use no more than 50 per cent of the drill-collar weight. In dipping beds, the percentage should be reduced to 25 per cent, or even to practically no weight in extreme cases.

Ratholing

The practice of "ratholing," often followed in coring, may lead to a crooked hole. This practice consists of drilling a smaller hole (rathole) with the core barrel and later reaming this hole to full size. If the large hole in which the coring is started has a flat bottom, the core bit may start off-center with the hole above; and in reaming the cored hole, the reamer will tend to follow the rathole (Fig. 3). As a result the slight offset near the top of the rathole may be aggravated into an appreciable deviation at greater depths. Use of a diamond-pointed bit immediately preceding the coring provides a means of assuring that the rathole is centered with the hole above the cored interval. Use of pilot reamers in enlarging the rathole then assures that the final reamed hole is in line with the hole above the cored section.

When drilling alternating hard and soft formations, it has been found that the course of the drill hole may be deflected from a vertical path by the dip of the beds. Oftentimes a bit will be deflected updip, while sometimes the deflection is downdip. The steepness of dip is the controlling factor; when the dip is gentle, the deflection is updip; when the dip is steep, the deflection may be downdip.

In Fig. 4 is illustrated the condition that causes deviation updip. The gently dipping hard bed B is encountered after drilling a relatively soft bed A. The face of the bit tends to assume a position perpendicular to the hard bed and thus goes through at an angle inclined toward a perpendicular to the bedding planes. Deviation due to this cause can be prevented by reducing the weight on the bit sufficiently when the hard bed is encountered.

Fig. 5 illustrates the manner in which a bit may be deflected downdip in steeply dipping strata. Here, the bit slides downdip when it encounters the hard bed B overlain by the relatively soft bed A. Thus, the bit tends toward a direction parallel to the bedding planes. In order to avoid deviation from vertical in such beds close control of the weight on the bit is necessary. If the weight carried is sufficiently low, a straight hole can be maintained. At any rate, the driller who tries to overcome the cause of his slower drilling rate by using more weight when the hard streak is encountered is making a mistake, since he may thus develop a crook in the hole.

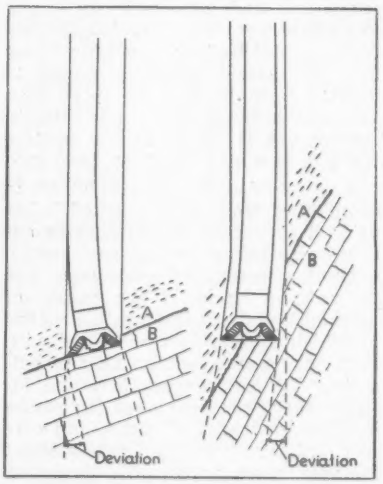


Fig. 4

Fig. 5

It will be noted from the discussion given above that weight on the bit must be watched carefully. Several of the "causes" of crooked holes mentioned above are not really causes, since their effect can be nullified by using a low enough weight on the bit. In this sense they only define the special conditions under which the weight on the bit must be less than when conditions are more favorable.

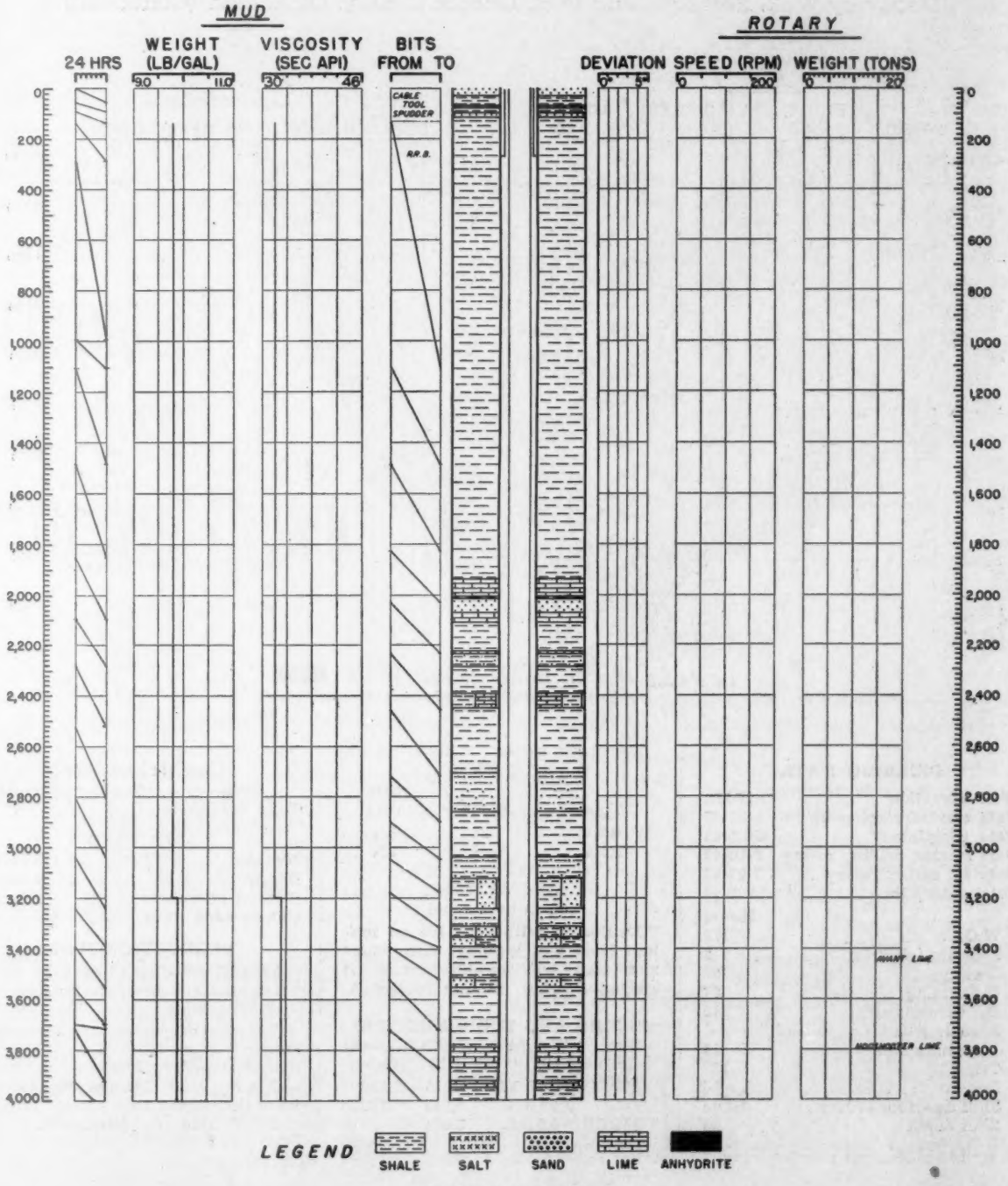
Journalog

No. 40

Discovery Well, North McLoud Pool, Lincoln County, Oklahoma

Stanolind Oil & Gas Co. 1 N. V. Leonard
SW SW SW 10-12n-2e

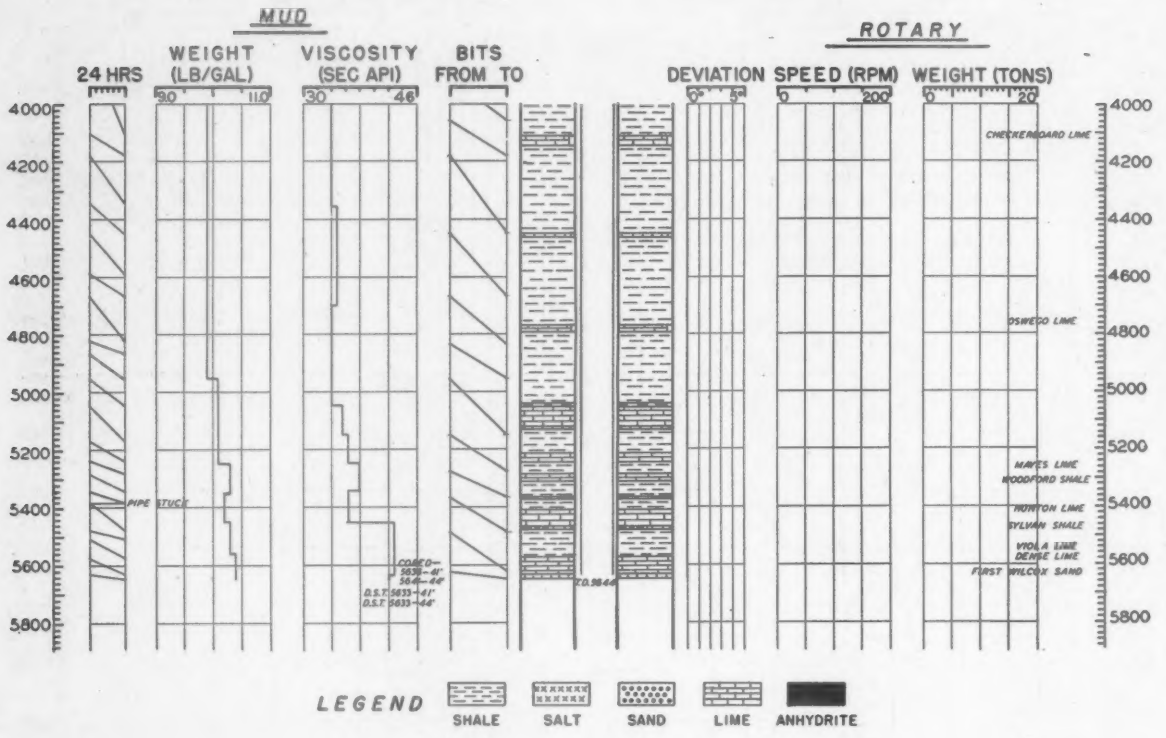
CONTRACTOR
Creekmore Drilling Co.



(Continued on Next Page)

Journalog

Discovery Well, North McLoud Pool, Lincoln County, Oklahoma (Continued)



DRILLING DATA

Well elevation	1,070 ft.
Date started rigging up	1-21-43
Date completed	5- 5-43
Date started drilling rotary	2-10-43
Date set casing rotary	3-29-43
Total rotary time	48 days
	Hours
W.O.C.	128
Logging (electric)	3
Coring	37
Circulating	77
Drill-stem test	16
Breaking down pipe and running casing	18
Trips	127
Repairs	60
Shut down for orders	None
Shut down	23

BITS USED

Type	Number	Size (in.)
Rock	28	9⅞
Rock	1	5¾

COMPLETION
(Open-hole type)

Drilled in with rock bit on tubing. Hole was washed with water and well was swabbed until it started flowing through tubing.

CASING AND TUBING RECORD

Size (in.)	Weight (lb.)	Depth (ft.)	Cement (sacks)
10¾	35 L.W.	255	250
7	25 S.S.	5,633	500
2½ EUE	6.5 S.S.	5,644	...

CORE HEADS USED

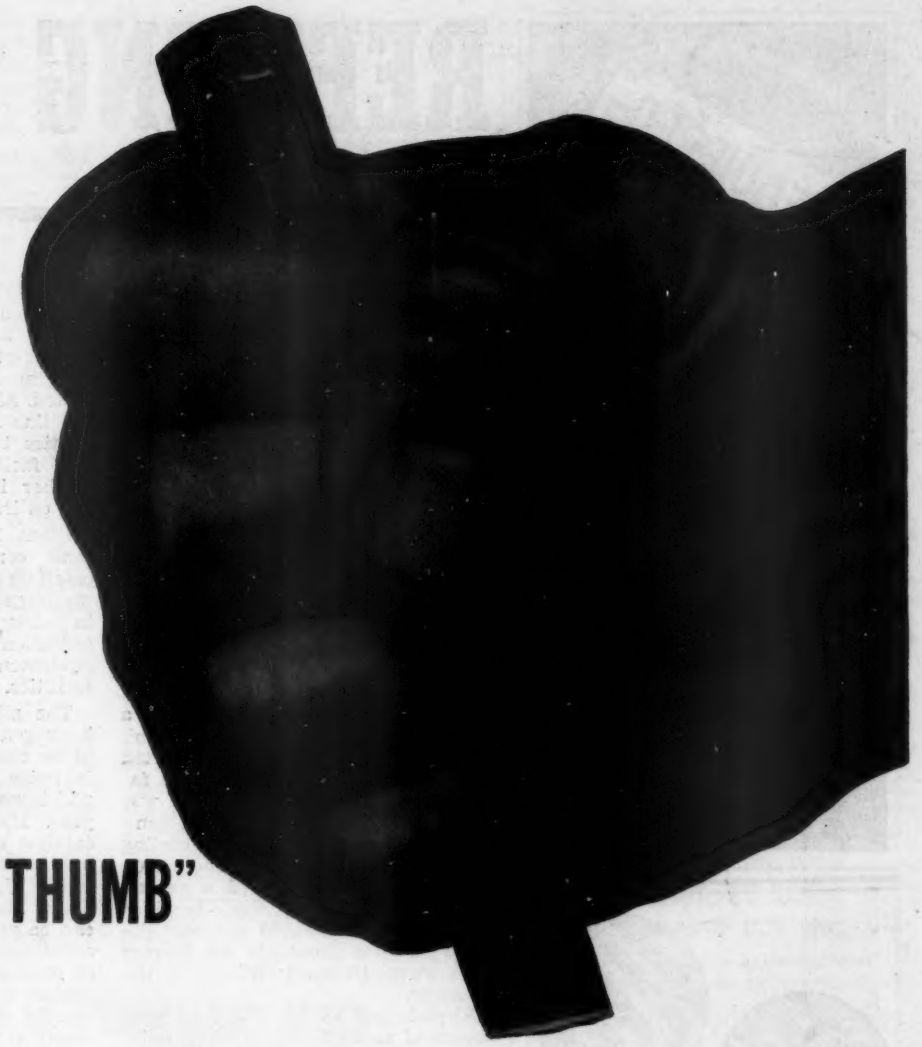
Type	Number	Size (in.)
Hard formation	2	7½

MUD USED

Aquagel	174 sacks
Baroid	55 sacks
Sodium phosphate	1 sack
Cotton seed hulls	900 lb.

PRODUCTION TEST

205 bbl. oil—first 24 hours
185 bbl. oil—second 24 hours
Water—None
Gas—Insufficient for measurement
Gas oil—Very low
B.H.P.—2,131 lb. per sq. in. at 5,620 ft. (—4,550 ft.)
B.H.T.—160° F. (estimated).



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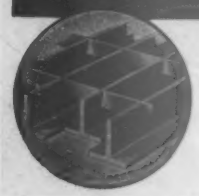


Full descriptive catalog of Tri-lok Grating, Safety Treads and other products on request.

REFINING

Sun Will Dedicate New Aviation Plant October 27

MARCUS HOOK, Pa.—Completion and successful operation of a new plant exclusively for the manufacture of 100-octane aviation gasoline by the Sun Oil Co. at its Marcus Hook, Pa., refinery, was announced this week by J. Howard Pew, president.

Simultaneously, the Sun Oil labor-management war-production committee announced that the new plant—largest of its type in existence—would be dedicated by Petroleum Administrator Harold L. Ickes on October 27.

Mr. Pew pointed out that this aviation-gasoline plant, constructed at a cost of $13,000,000, is the latest link in the Sun company's program started in 1939 for the conversion of its facilities to maximum possible war production. This completes Sun's original war conversion plant costing approximately $20,000,000 and clears the way for the start of a second program. Altogether Sun facilities costing over $36,000,000 are now devoted to war products at Marcus Hook alone, financed entirely by the company.

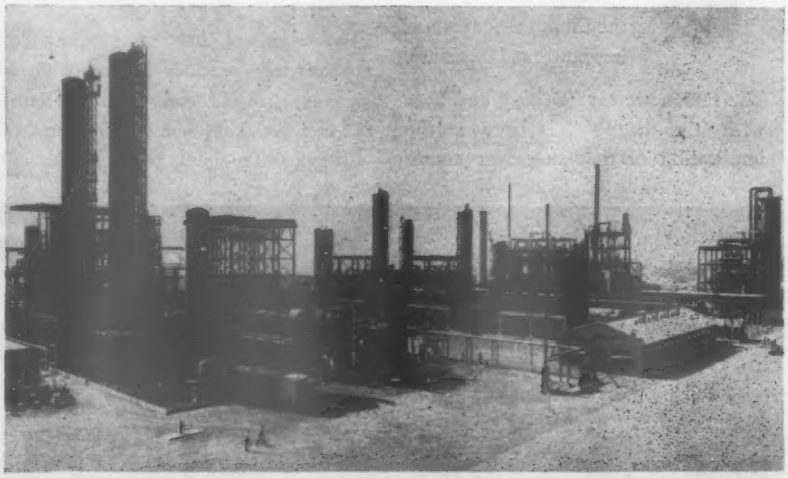
Already one of the foremost producers of catalytically cracked aviation fuel, Sun's production of this vital war product is being substantially increased as a result of the operations of the new units, known as Plant 15.

This plant went on stream in test operations several weeks ago and the results have met the fullest expectations of the Sun engineers and the government authorities, Mr. Pew asserted. Although a complete aviation-gasoline refinery within itself, Plant 15 ties together all of the aviation-fuel facilities at Marcus Hook, still further increasing the efficiency of the entire operation.

Plant 15, on a 123-acre tract of land, consists of a 6-case Houdry catalytic cracking or treating unit; the largest alkylation unit of its kind in existence; a gas-recovery and stabilization unit and complete auxiliary equipment necessary to operate these facilities.

The alkylation unit is the second hydrogen fluoride alkylation plant to be completed in this country and is twice as large as the first one which went into production early this year. Hydrogen fluoride acts as a catalyst and combines isobutane and butylenes to form isooctance, an essential ingredient of aviation fuel. Some idea of the size of the unit can be gained by the fact that its six contactors will circulate a mixture of hydrocarbons and hydrogen fluoride at a rate of 300,000 gal. a minute. In order to remove the heat of reaction, water at the rate of 16,800 gal. a minute is circulated through tubes in the upper part of the reactors.

The gas-recovery and stabilization plant will receive all the gases and



Sun Oil Co.'s new aviation-gasoline plant at Marcus Hook, Pa., now in successful operation, will be dedicated by Petroleum Administrator for War Harold L. Ickes, on October 27

unstabilized gasoline from the Plant 15 Houdry unit, as well as from other Houdry units in the Marcus Hook refinery, for segregation, compression and fractionation. This plant not only provides sufficient isopentane, another ingredient of aviation fuel, for all the requirements of Marcus Hook, but produces surplus isopentane for shipment to other companies deficient in this material. This unit also produces butane-butylene for charge to the alkylation unit. Propane-propylene is being separated for use as industrial fuel in such quantities that the available stocks of this material will thus be greatly amplified on the Atlantic Coast and transportation of this material from the Mid-Continent area will be correspondingly decreased, thus releasing tank cars for other needed petroleum products.

The new Houdry unit at Plant 15 is being used for treating aviation-base gasoline produced on other Houdry units at Marcus Hook. This was the twentieth Houdry catalytic cracking unit to go into operation as a part of the aviation-gasoline program throughout the country.

Grease Institute to Meet at Chicago November 1, 2 and 3

The National Lubricating Grease Institute will hold its annual meeting at the Edgewater Beach Hotel, Chicago, on November 1, 2 and 3, according to announcement by George W. Miller, executive secretary. Program for the meeting has not yet been announced but is expected to deal largely with problems of supplying the armed services with lubricants, and with specifications for these products.

District 2 Capacity Fading, Vandeveer Warns Oil Men

INDIANAPOLIS, Ind.—The Middle West is losing 15 per cent of its daily refining capacity because of lack of crude oil, W. W. Vandeveer of Chicago, director of District 2, Petroleum Administration for War, said at a meeting here last week.

An increase in the price of crude oil is essential to help to fill the open daily refinery space of 205,000 bbl., Mr. Vandeveer said, adding that PAW was trying to adjust freight rates to allow West Texas crude oil to be moved into the Middle West.

A new system of decentralized authority allows regional PAW officials to establish and adjust the rate of crude-oil runs to refineries, Mr. Vandeveer told the oil men. This, he said, will help solve some distribution, construction and conversion problems without reference of them to a board of strategy hundreds of miles away.

Clodine Price Posted

Stanolind Oil Purchasing Co., Tulsa, last week posted prices for the first time in the Clodine field, Texas Gulf Coast area. The posting ranges from 93 cents for below 20-gravity oil to $1.35 for 40 gravity and above. The schedule became effective at 7 a.m. October 15.

Sketches of Plant Operators

FRANK L. WALLACE, general superintendent at the Texas Co.'s Port Arthur, Tex., refinery for the past 4 years, has been promoted to the position of works manager, succeeding F. P. Dodge. Mr. Wallace's post of general superintendent has been filled by D. P. Bailey, who returned to company service after aiding the Refinery Division, Petroleum Administrator for War, in shaping up the war-products program.

Mr. Wallace was born in Huntington County, Indiana, and was graduated as a mechanical engineer from Purdue University.

From 1917 to 1919, he served as a first lieutenant in the ordnance department of the Army.

In May 1919, when mustered out of military service, he started with Texas Co. as an efficiency engineer helper in the power department at the Port Arthur works.

In December 1922, he was made head foreman of the power department, and became second assistant superintendent of the plant in September 1930.

He was promoted to assistant general superintendent in April 1934, and became general superintendent in May 1939.

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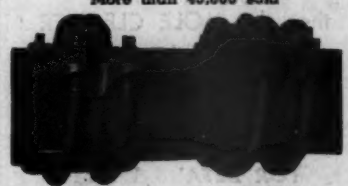

Fig. 7002 Fig. 7001

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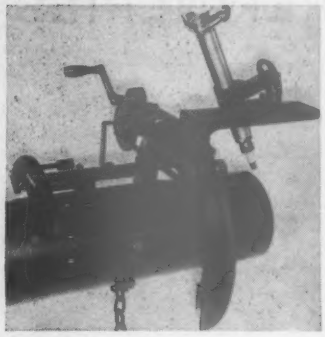

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Fort Madison, Iowa

PIPE LINES

WEP Prepares to Test 20-in. Products Line

Testing of War Emergency Pipelines, Inc., 20-in. products line in the section completed between Longview, Tex., and Norris City, Ill., is scheduled to commence Monday, October 25. Testing will be done with water raised to 800 to 900-lb. pressure. Under favorable conditions, testing should be completed within 10 days. The first shipment of heating oil is due to start through the line between November 10 and 15.

Less than 160 miles of 20-in. pipe remain to be laid east of Norris City. Of the nine spreads still on the job, two will be completing their work this week.

In spite of the operating difficulties experienced by WEP as the result of slow deliveries at the Longview terminal, an average of approximately 300,000 bbl. of crude oil daily has been shipped through the 24-in. line to Norris City this month. On October 17, a total of 318,246 bbl. of crude oil were forwarded from the Norris City terminal of which 216,000 bbl. were destined for delivery through the eastern leg of the WEP 24-in. line to refineries in the New York and Philadelphia areas. The remainder was for shipment by tank car either directly from Norris City or via the Ohio Oil Co. system to loading racks with which it is connected. The present schedule calls for loading 250 cars daily at the Norris City terminal for the remainder of October.

Service Pipe-Line Men Are Assigned to Construction

David R. Williams and Guy S. Connors, vice presidents, Williams Brothers Corp., have been cooperating with military authorities in an effort being made to have pipe-line construction men who are now in the armed services, shifted to assignments on construction jobs undertaken for the war program. As a result, the Government would benefit by their skill which is vitally needed for important work.

The spirit of men bein transferred for this purpose is indicated in a letter recently received by the Williams Brothers executives from Fred Strobel, A.S. Co. 1194-U.S.N.T.S., Great Lakes, Ill., who was a foreman on construction work in Africa before joining the Navy. In discussing the possibility of being assigned pipeline work in accordance with the new program, he wrote: "When we were in Africa our schedule called for 48 hours a week. Any time we had material I worked about 65 hours a week. . . . What this country needs is a lot of men who do not care how tough the work is and how long the hours are in wartime."

Stanolind Contracts River Crossings and Stringing

For the construction of crossings for six rivers on the Slaughter, Tex.-Drumright, Okla., 16-in. crude-oil line, Stanolind Pipe Line Co. has awarded contract to O. C. Whitaker Co. Extensive dewatering will be done in the operations to place the lines below the scour depth of the rivers. At the Canadian River this may be more than 20 ft. below the present river bed.

Arrangements have been made for the project with common carrier truck lines for stringing as follows: Jobs 1 and 2, Parkhill Truck Co.; Job 3, J. L. Cox & Son; Job 4, C. Hobson Dunn; Job 5, John B. Barbour Trucking Co.; Job 6 (river crossings), Service Trucking Co. These firms are oilfield haulers which have specialized in pipe-line stringing.

Program Pushed for Tennessee's Gas Line

Tennessee Gas & Transmission Co. is moving into new offices in the National Standard Building, Houston, Tex., where the fifth and sixth floors have been remodeled to accommodate the staff which is now in the process of being assembled and organized under the direction of Ray C. Fish, vice president and general manager. The company has had a temporary office in the Second National Bank Building, Houston.

The company is proceeding with plans to build a 1,200-mile, 24-in. pipe line for transmitting 300,000,000 cu. ft. of natural gas at 750-lb. pressure from the Stratton and Neuces areas near Corpus Christi, Tex., to Kenova, Ky.; from there to Cornwell, in the vicinity of Charleston, W. Va., the company will build 80 miles of 18-in. line.

Seven compressor stations at 200-

mile intervals and a dehydrating plant, to be located at the west end of the line, will be constructed by Stearns-Roger Manufacturing Co. Arrangements for the construction of the line will be handled directly by the company organization. Inspection of the line will be done by Brokaw, Dixon & McKee. Contracts for laying the line will be let by the middle of November.

Despite local Texas opposition, the Tennessee organization is going ahead with its project which has been authorized by WPB and FPC as necessary for furnishing industrial fuel needed for war industries.

Gov. Coke R. Stevenson of Texas declared last week that he believed public sentiment in Texas "probably will stop" construction of the proposed natural-gas line from Corpus Christi to the West Virginia industrial area.

"Furthermore, from what I hear, one of the boards in Washington has not given its approval to the line," Stevenson said in an interview.

Asked to name the board, the governor said, "I think it is the WPB or the board that deals with utilities."

"While I cannot speak with authority—especially when I am away from the office—I am told that this is the case," he said.

Shell Progresses With Reconditioning of Line

The reconditioning of 87 miles of 10-in. pipe of the Shell Pipe Line Corp. system between the Gulf Coast and East Texas has required special measures. Instead of taking up the pipe in 20-mile sections as originally planned, the line has been handled in 10-mile sections. The line has been continually in operation except for the 10-hour periods when sections of reconditioned pipe are tied into the line.

In addition to cleaning the pipe with a mechanical pipe-cleaning machine, operating with cutter wheels, it has been found advisable to clean the pipe further with a grit-cleaning machine which operates at a speed of 5 to 50 ft. per minute and not at the speed incorrectly mentioned in an article entitled, "Machine Cleans Pipe With Steel Grit," page 236, September 23, 1943, issue.

Arctic Pipe Line Contributes to War

The existence of a gasoline distribution pipe line stretching for 1,000 miles from Skagway in southeastern Alaska to Fairbanks, Alaska, supplying gasoline to United States air bases in Canada and Alaska, was disclosed officially at Fairbanks recently.

The line extends from Skagway through Whitehorse, Y. T., and thence to Fairbanks.

The Standard Oil Co. of Alaska recently was formed at Fairbanks to distribute the gasoline and operate the system for the Army on a dollar a year plus cost basis.

The project removes a burden from the Alaska Railroad which formerly carried all gasoline to Fairbanks, and makes possible shorter, safer hauls for tankers from the United States, as the route to Skagway is largely through the well-protected waters of the inside passage.

The pipe line is seen as a great potential factor in the postwar development of the Tanana Valley farming and mining area, bringing cheap fuel to the area for the first time.

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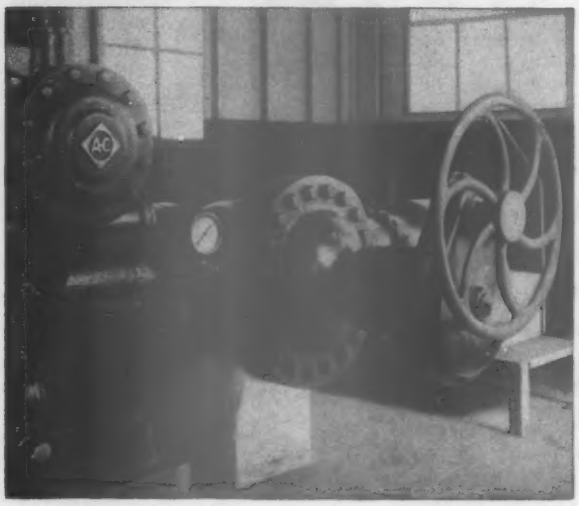

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Construction Features: Self-releasing 30° angle wedges and free-floating gates, self-adjusting to seats, afford smooth, trouble-free performance, long service. Rings are cleaned throughout stroke action. Gates are wedge-locked directly opposite ports and completely unwedged before raising. Ample tolerances provide easy action. Simple construction permits easy replacement of parts.

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Let Our Hospital Ship Experience Help With Your Post-War Designs

Out of today's war-time emergencies will come more efficient and dependable peace-time products. Important improvements are being made in power transmission. Our engineering skill and experience have not been frozen. Let our engineers help with your post-war plans by suggesting more effective applications of

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The Model VE-4, dimensionally illustrated above, is a typical example of the extremely compact power packages that carry the Wisconsin name plate. This 4-cylinder V-type engine delivers 22 hp. at 2600 rpm. Other Wisconsin air-cooled engine sizes run from 1 hp. to 31 hp. Get our literature and check for Size and Power on your equipment.

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OIL FIELD DISTRIBUTOR FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS

Natural Gas

Four Men to Address Natural Gas Section

ST. LOUIS, Mo.—Four major addresses are on the program of the Natural Gas Section, American Gas Association, which will hold its annual meeting here October 26-28.

Burt R. Bay, chairman of the Natural Gas Section and president of the Northern Natural Gas Co., Omaha, Neb., will preside and deliver the chairman's annual address. Ralph K. Davies, deputy petroleum administrator, will speak on an unannounced subject and Grover T. Owens, Owens, Ehrman & McHaney, Little Rock, Ark., will speak on "Our Postwar Responsibilities." Another speaker is to be arranged before the meeting. Presentation of honorary awards and the business meeting will conclude the natural gas phase of the general association meeting. All of the natural gas program will be held October 26.

Among the principal speakers before sessions for the general association are Arthur F. Bridge, president; Co. W. F. Rockwell, director of production, U. S. Maritime Commission; Dr. W. H. Sebrell, associate director, Food Distribution Administraton, and Paul R. Taylor, director, Natural Gas Division, Office of War Utilities.

Several sessions are devoted chiefly to postwar problems, to technical developments within the industry and to accounting practices.

Gas Showing May Result in Deep South Dakota Test

WATERTOWN, S. D.—Development of a deep gas showing in Potter County, South Dakota, may result in the sinking of a deep test in the same area by an eastern syndicate shared interest in South Dakota oil development circles this summer and fall.

The gas test, north of Whitlock's Crossing in Potter County, just east of the Missouri River, substantiated results of a survey of the area made by the state Geological Department in showing a structure of considerable size. The gas volume was small, showing about 86,000 cu. ft. daily.

Reports have circulated since the completion of the gas test that the group of Gettysburg, S. D., men, who financed the gas test, have been approached by representatives of an eastern syndicate who have offered to drill a deep test in the area. If a satisfactory arrangement can be reached as to the transfer of the lease block, drilling of a well to test all formations above the granite appears likely.

Grand Trunk Plans Postwar Pipe Line

An application to tap the Hugoton natural-gas field, Kansas, with a 300-mile pipe line as "an early postwar project" across southern Kansas has been filed with the Kansas Corporation Commission by Grand Trunk Pipe Line, Inc., of Independence, Kan., Paul R. Johnson, president. He is also president of the Union Gas System, Inc.

Starting at Range 34, west, the line would extend 300 miles almost straight east to a point near Chanute, Kan. It is proposed to serve all other intersecting gas carriers and any municipal distribution systems which might want to obtain fuel.

The application declares a line being built from the Hugoton field by the Cities Service Gas Co. in Oklahoma would be "one which will not satifactorily serve the areas here considered," and that it would be of only indirect benefit to Kansas.

Earlier Johnson sought War Production Board priorities to build such a Kansas line immediately, but was unsuccessful.

Natural Gasoline

Natural Gasoline Corp. and Humble Builds Hawkins Plant

The plant which Natural Gasoline Corp. and Humble Oil & Refining Co. are building near Hawkins, Tex., consists for the most part of equipment being moved from Aransas Pass, Tex., obtained by dismantling a plant which had been operating for more than 6 years up to the time it was shut down 2 weeks ago. Natural Gasoline Corp. is associated with Warren Petroleum Corp.

The Hawkins plant will have capacity of 14,000,000 cu. ft. daily for producing 60,000 gal., total products. These will consist of propane, isobutane, normal butane, isopentane and natural gasoline. Gas will be gathered from more than 400 wells, most of them owned by Humble, through 100 miles of gas gathering lines varying from 2-in. to 24-in.

The principal features of additional equipment will be new 3,000-hp. compressors for absorption at 200 lb. pressure and a five-column fractionating system for straight line fractionation. The plant being moved from Aransas Pass is a Tulsa type which will be erected by Gasoline Plant Construction Corp.

The project will be operated for the joint account of Natural Gasoline Corp. and Humble Oil & Refining Co. Products from the plant will be shipped either by the Humble Pipe Line Co. or by tank cars.

S. M. Barrett, formerly superintendent of the Aransas Pass plant, becomes superintendent of the new plant at Hawkins. The undertaking is conducted under the direction of H. W. Harts, vice president in charge of manufacturing for Warren Petroleum Corp. It is expected the plant will be on stream January 1 and will be completed early in February.

Texas Panhandle, Illinois And Oklahoma Raise Output

WASHINGTON, D. C.—Increases in the Texas Panhandle, Illinois and Oklahoma advance August production of natural gasoline and allied products to a daily average of 239,000 bbl., a gain of 4,000 bbl. over the July output. Yield for the first 8 months this year has averaged 236,000 bbl. daily, an increase of 9,000 bbl. over the rate for the same period in 1942.

The production of natural gasoline alone totaled 183,036,000 gal. in August compared to 176,190,000 gal. in July. Production of allied products was slightly lower.

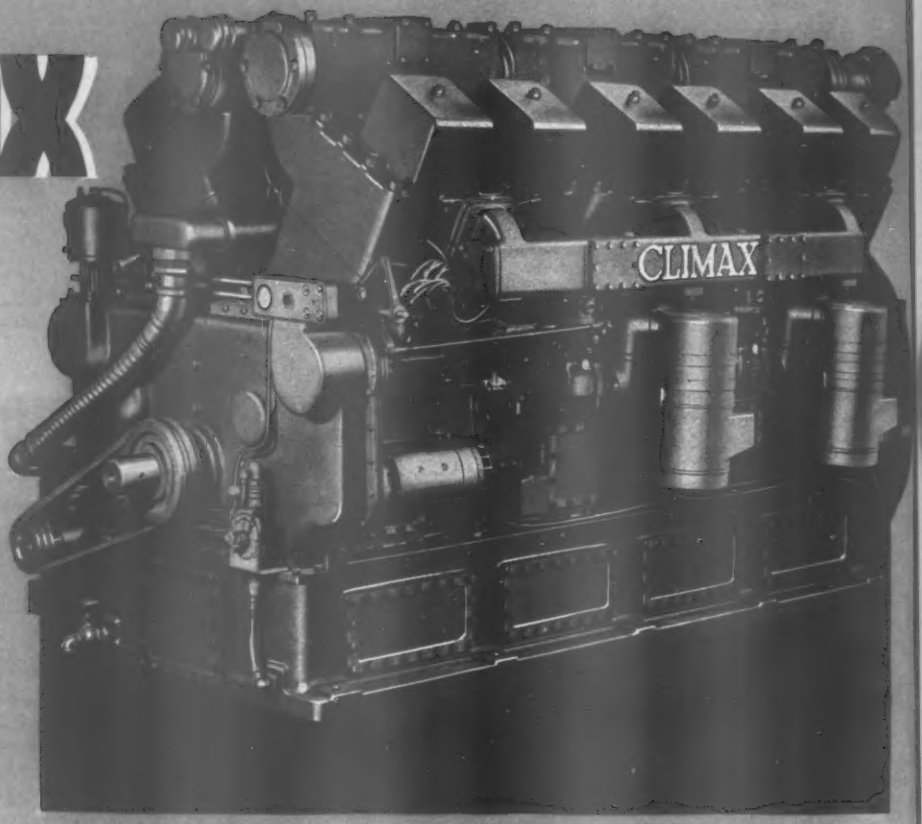
AUGUST PRODUCTION
(Thousands of gallons)

	August	July
Natural gasoline	183,036	176,190
Cycle products	54,726	55,146
Liquefied petroleum gases:		
Isobutane*	13,608	13,524
Other L.P.G.*	59,472	61,194
Liquefied refinery gas	13,692	16,674
Benzol	8,400	8,400
Total production	332,934	331,128

*At natural-gasoline and cycle plants.

Drilling Engine **NEWS** *of the Year!*

THE Climax NEW V-12



Compactness • Short overall length • Light weight • Balanced design • High mechanical efficiency and accessibility of parts are but a few of the operating benefits obtained by specifying the Climax New V-12.

Investigate the merits of this engine today. It is *the* engine for your present deep well drilling jobs, and will make you a sound long-term investment for post-war contracts.

SEND FOR Engine Bulletin No. S329, which describes this engine in greater detail, to Climax Engineering Company, Clinton, Iowa, or to the distributors below.

SPECIFICATIONS (Briefed from the New V-12 Engine Bulletin)

TYPE AND SIZE—12 cylinder, 60° V; 6½" or 7" bore; 375 hp. or 435 hp. at 1200 r.p.m.

DIMENSIONS—58¾" high, 51½" wide, 95" long.

SPEED RANGE—600 to 1200 r.p.m. is normal for continuous or intermittent service.

FUEL—Natural gas, butane or gasoline in an emergency.

STARTING—Integrally mounted gasoline engine.

IGNITION—Dual distributor, dual magneto or distributor and magneto. Each cylinder has two spark plugs.

LUBRICATION—Full pressure at approximately 35 lbs.

MOUNTING—Structural steel oil field skids, including power take-off and support.

ACCESSORY EQUIPMENT—A complete range is available—radiators, fans, water cooled manifold, couplings, etc.

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Exploration and Drilling

Week's Highlights

THE discovery of oil in the Embar in Gebo dome, at the southern end of the Big Horn basin may rank as the best discovery of the year. The discovery well reported 107 ft. of saturated section and is drilling ahead to test the Tensleep which in other parts of the basin is a better pay than the Embar (p. 114). The latest play in this area started with the development of rich Tensleep production at Oregon Basin in the middle of the west side. This was followed by discovery of Tensleep oil at Elk Basin in the north end of the basin covering an even larger area. This find may cause the Elk Basin field to displace Salt Creek as Wyoming's largest producing area. Gebo dome rounds out the exploration history of one-half of the perimeter of the basin.

On the east side of the basin, the only production has been in the Greybull area. It has come from Cretaceous sands and has not been important. Prospecting of this side may be expected to arouse considerable interest. The Big Horn basin, has an area approximately equal to that of the Illinois basin and there has been no exploration in the basin proper. In the center, it is thought that the Tensleep will lie at about 15,000 ft. so that the whole area is within reach of the drill. Whether deeper structures will prove as good as those around the margin is, of course, anybody's guess at present.

The reported opening of a new pool in Pratt County, Kansas (pp. 127 and 130) will give trend followers additional information of interest. A northeast-southwest line through this pool crosses seven pools from Abbyville to Bear Creek in Barber County, a distance of 65 miles. Paralleling this trend to the east is a shorter one linking Deerhead and Lake City in Barber County. Then comes a third which runs from the south end of the Burrton field to Medicine Lodge. To the west is a fourth starting at Turkey Creek, Barber County, and passing through Iuka and Carmi in Pratt County to Zenith.

These trends run approximately at right angles to the Central Kansas uplift and extend far into the Dodge City basin. Far to the northwest, other parallel trends are suggested by small pools. These trends are similar to others found in the Illinois and Michigan basins. All three areas were zones of relative subsidence and in such areas there is a tendency to wrinkling along radial lines. There is also a tendency for the development of concentric folds, parallel to the margins of the basin. Where these two trend patterns intersect, there are local highs. The pattern is not geometrically regular but much valuable information on where to start looking can be obtained from trend maps.

The finding of Canyon production in King County, Texas, may open a new county to commercial production (p. 107). The old West Central district has been gradually extended westward from the Bend arch and Jones County is now the most active in the area with the greatest daily output. In the North Texas sector, however, the principal extension of the producing area has been to the east of the arch and the west flank has yielded only a few producing spots of very limited importance. Between this area and the easternmost fields in the West Texas basin there is a broad belt with no production. In this area, the Permian section changes from marine limestone to red beds and chief hope for production is in the deeper beds. It is an area in which production will have to be extended gradually by stepping out from known pools and if it is successful, the King County discovery may stimulate much activity in this area.

COMPLETIONS IN ALL FIELDS . . .

(Week ended October 16, 1943)

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1943	1942
N. Y., Penna., W. Va.	47	13	2	62	130,304	2,708	2,723
Ohio	3	10	11	24	63,583	726	900
Indiana	0	0	0	0	0	175	267
Kentucky	3	2	5	10	22,860	338	157
Illinois	31	0	13	44	117,255	1,391	1,396
Michigan	3	0	14	17	47,874	480	561
Kansas	8	1	22	31	114,048	1,303	1,248
Nebraska	1	0	1	2	5,610	26	29
Missouri, Iowa	0	0	0	0	0	13	12
Oklahoma	8	3	2	13	31,816	934	947
Texas:							
North Central Texas	17	0	22	39	107,623	1,153	894
West Texas	13	0	2	15	52,596	690	1,114
Texas Panhandle	5	0	0	5	15,410	142	287
Eastern Texas	4	0	1	5	23,232	230	322
Texas Gulf Coast	3	1	5	9	65,148	361	564
Southwest Texas	8	0	5	13	61,991	722	845
Total Texas	50	1	35	86	326,000	3,298	4,016
North Louisiana	3	0	3	6	24,964	249	379
Louisiana Gulf Coast	3	0	2	5	51,806	283	389
Total Louisiana	6	0	5	11	76,770	532	768
Arkansas	4	0	3	7	26,831	200	138
Mississippi and Southeast	1	0	2	3	20,329	72	46
Montana	2	0	5	7	15,383	179	159
Wyoming	2	0	0	2	9,030	112	88
Colorado, Utah	0	0	2	2	5,209	21	19
New Mexico	4	0	2	6	13,941	181	190
California	20	1	4	25	82,857	1,050	584
Total United States	193	31	128	352	1,109,700	13,740	14,246
Total previous week	235	44	137	416			
Week ending Oct. 17, 1942	211	39	101	351			

Drilling Increases Sharply in September; Wildcatting Off

COMPLETIONS reported during September showed a sharp upturn, the total being larger than during any month since January 1942. The number of oil-well completions was exceeded during that period only by those of February 1942, while the number of dry holes drilled during the month was greater than during any month since July 1941, when there were 3,165 completions.

These figures present some interesting conclusions. Despite adverse economic conditions, the search for oil is increasing but the success of that search is not proportional to the amount of drilling done. The number of dry holes now being drilled is approximately the same as when drilling activity was some 65 per cent greater than at present. Despite an increase of 50 per cent from January of this year, the industry has to gain another 65 per cent before it reaches the normal prewar level of total completions. The record, however, shows that the proportion of dry holes to producers is abnormally high so that to complete the normal number of oil wells an 80 per cent increase would be necessary.

Continuing this line of thought, it is obvious that as the number of dry holes must increase if the industry is to complete the normal number of oil wells, the drilling cost has increased per barrel of new oil found. To this can be added the fact that the average initial production of wells completed in the middle of 1941 was about 330 bbl., whereas today it is around 190 bbl.

Thus, not considering increased labor and material costs and based entirely on the quantity of oil found, drilling costs per barrel are more than double what they were in 1941.

Of the total increase of 129 producing oil wells over August, 93 were in Texas. This emphasizes the fact that operators drill where there is a demand for oil and recent allowable increases in Texas have stimulated much activity.

The discovery record shows that wildcatting is more successful than ever in one respect and less successful in another. During the first 9 months of 1943, 289 wildcats found oil and 117 found gas or distillate. However, the total amount of new oil found was less than in previous years. Most of this year's discoveries will result in fewer five-well pools and of the larger finds, most are deeper sands in old fields. The most important discoveries of the year have been in the Lower Cretaceous of East Texas and in Wyoming. The most important new pay found has been in the Ellenburger of Winkler County, Texas. Here, however, drilling costs are almost prohibitively high and until increased prices and higher allowables are assured, development of these deep pays will be slow.

The trend of exploratory drilling is up, the total number of wildcats drilled during the third quarter being 1,012, or 337 a month. This contrasts with an average of 255 during the first half year. Although September figures are below those of August, this cannot be interpreted as a down trend as the number of completions in August was abnormally large. The trend is shown by the fact that during the past 9 months 40 per cent of the total wildcats and 40 per cent of the discoveries were completed in the last 33⅓ per cent of the period under review.

SUMMARY OF OPERATIONS, SEPTEMBER 1943

	Comp.	Oil	Prod.	Gas	Dry	Under 1,000 (ft.)	1,000-2,500 (ft.)	2,500-5,000 (ft.)	5,000-10,000 (ft.)	Over 10,000 (ft.)	Footage	Rigs and drilling
Appalachian	*291	172	341	91	28	0	244	38	9	0	597,065	319
Ohio	91	18	720	33	40	12	28	51	0	0	231,008	191
Indiana	40	14	1,122	0	26	8	24	8	0	0	69,962	40
Kentucky	80	33	5,432	14	33	11	48	21	0	0	160,156	146
Michigan	78	23	5,920	10	45	5	38	35	0	0	187,706	115
Illinois	147	86	14,415	0	61	3	55	89	0	0	381,300	193
Kansas	181	94	27,023	2	85	0	8	172	1	0	633,736	256
Nebraska	4	0	0	0	4	1	0	3	0	0	11,976	1
Missouri, Iowa	2	0	0	0	2	1	1	0	0	0	3,241	3
Oklahoma	147	58	12,181	12	77	11	48	66	22	0	463,174	318
North Texas	116	68	18,103	0	48	21	46	31	18	0	289,299	54
West Central Texas	36	16	4,363	1	19	9	16	11	0	0	70,601	17
West Texas	82	68	32,441	2	12	2	9	39	32	0	368,467	3
Texas Panhandle	14	12	2,124	1	1	0	1	13	0	0	42,421	11
East Texas	24	12	5,456	0	12	1	0	4	19	0	149,730	33
Upper Gulf Coast	79	39	10,465	5	35	0	0	11	64	4	543,915	86
Lower Gulf Coast	65	36	7,100	6	23	0	0	14	51	0	389,870	112
South Central Texas	13	6	900	0	7	0	2	3	8	0	29,289	24
South Texas	68	36	4,760	3	29	0	8	36	24	0	286,348	74
Total Texas	497	293	85,614	15	189	33	82	162	216	4	2,169,940	414
Southeast New Mexico	19	16	1,714	0	3	0	4	15	0	0	59,597	47
Arkansas	21	9	1,823	0	12	0	2	11	8	0	95,012	50
North Louisiana	26	7	670	9	10	0	10	10	6	0	99,538	48
Louisiana Gulf	29	18	2,785	1	10	0	2	2	17	8	229,336	110
Mississippi	6	1	150	0	5	0	0	6	0	0	17,588	27
Montana	25	14	987	1	10	0	11	14	0	0	61,867	101
Wyoming	13	12	11,650	0	1	0	0	8	5	0	62,344	85
Colorado, Utah	0	0	0	0	0	0	0	0	0	0	0	32
Northwest New Mexico	1	0	0	0	1	0	1	0	0	0	2,009	13
California	128	90	11,985	3	35	8	44	52	23	1	435,960	209
Alabama	0	0	0	0	0	0	0	0	0	0	0	1
Florida	1	0	0	0	1	0	1	0	0	0	2,030	3
Total September	1,827	950	184,550	194	675	93	651	763	307	13	5,974,565	2,722
Total August	1,610	827	161,635	156	623	82	434	676	203	15	5,084,781	2,788

*Does not include 138 input wells.

MONTHLY WILDCAT COMPLETION RECORD, JULY-SEPTEMBER 1943

	Oil			Distillate			Gas			Dry			Total		
	July	August	Sept.	July	August	Sept.	July	August	Sept.	July	August	Sept.	July	August	Sept.
Ohio	0	2	1	0	0	0	0	3	1	7	9	4	7	14	6
Indiana	0	0	0	0	0	0	0	0	0	3	2	2	3	2	2
Kentucky	2	4	4	0	0	0	1	1	0	6	8	5	9	13	9
Illinois	10	11	10	0	0	0	0	0	0	43	48	20	53	59	30
Michigan	1	4	0	0	0	0	0	0	1	5	22	21	6	26	22
Kansas	6	5	3	0	0	0	0	0	0	36	19	37	42	24	40
Nebraska-Missouri-Iowa	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5
Oklahoma	3	5	3	0	0	1	0	3	0	30	32	22	33	40	26
Texas:															
North Central	4	13	3	0	0	0	0	0	0	38	54	29	42	67	32
West	1	5	2	0	0	0	0	0	0	4	11	5	5	16	7
Panhandle	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0
East	0	0	0	0	0	0	0	0	0	5	14	7	5	14	7
Gulf Coast	0	0	0	1	0	1	0	0	0	13	12	5	13	12	6
Southwest	1	1	1	1	1	1	0	0	2	22	24	27	24	26	31
Total	6	19	6	1	1	2	0	0	2	82	117	73	89	137	83
Louisiana:															
North	0	1	0	0	0	0	0	1	0	8	4	3	8	6	3
Gulf Coast	0	1	1	0	0	2	0	0	0	1	4	2	1	5	5
Total	0	2	1	0	0	2	0	1	0	9	8	5	9	11	8
Arkansas	1	0	0	0	0	0	0	0	0	10	6	4	11	6	4
Mississippi	0	1	0	0	0	0	0	0	0	3	4	5	3	5	5
Montana	0	0	0	0	0	0	0	0	0	4	1	6	4	1	6
Wyoming	0	0	0	0	0	0	0	0	0	2	2	1	2	2	1
Colorado, Utah	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
New Mexico	0	2	3	0	0	0	0	0	0	0	5	1	0	7	4
California	9	1	2	0	0	0	1	1	2	5	16	14	6	18	18
Total	29	56	33	2	1	5	3	9	6	245	299	225	278	365	269

N. CENTRAL TEXAS

Rank Wildcat Shows Oil In King County

WICHITA FALLS, Tex.—Principal interest in the North Texas district was centered on King County, where Humble Oil & Refining Co. 1 Ed Bateman, 660 ft. from east, 4,202 ft. from north lines of Section 101, Block A, J. B. Rector Survey, east of Guthrie, opened a new field in rank wildcat territory. The well had Canyon lime, Pennsylvania series, from 3,702-13 ft., showing 670 ft. of oil and 100 ft. of oil cut with mud on 30-minute drill-stem test at this depth. After running electric log 5½-in. casing was cemented at 3,702 ft., and upon drilling plug, the well swabbed 15 bbl. per hour. After the section was treated with 1,000 gal. then 3,000 gal. of acid, the well cleaned itself and flowed 30 bbl. in 1 hour and was shut in for storage. The discovery is midway between the Johnson pool of western Foard County and the Carlile pool of northwest Stonewall County, being 25 miles from each pool. The well is on a 37,000-acre block held solid by Humble. Surrounding territory consists of large ranches, making an ideal situation for lease blocking, and this condition may stimulate a rapid wildcatting campaign in King, Knox, Foard and Cottle counties.

Young County.—What appeared to be a disappointment in the Mississippi lime, Deep Rock Oil Co. 2 Morrison, south offset to the discovery of the Deep Rock pool of southwest Young County, was drilled deeper to 4,543 ft., and was reported to be flowing oil by heads. Anderson-Prichard Oil Corp. 1 Myers-Walsh, G. Walsh Survey, topped Barnett shale at 4,404 ft. and Mississippi lime at 4,514 ft., no shows, and was drilling ahead.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County: L. T. Burns 3 J. B. Frerich, 1,400 ft. from S & W, Lot 106, Blk 4, Clark & Plumb subd., dry, T.D. 1,230 ft.

Montague County: Continental Oil 1 H. C. Gadberry, NW NW Sec. 65, E.T. Ry. Sur., ¾ mi. east extension Hildreth pool, flowed 519 bbl., Bend conglomerate pay 6,138-43 ft., Viola 6,643 ft., Simpson sand showing oil 7,300-10 ft., perf. 6 shots 6,138-43 ft., T.D. 7,310 ft.

Lion Oil Ref. 1 Nocona Freeman, 861 ft. S, 508 ft. E of NW C W. R. Freeman Sur., 6 mi. S Forestburg, dry, Marble Falls 6,664 ft., Ellenburger 8,580 ft., T.D. 8,616 ft.

Seitz, Comegys & Seitz 1 S. H. Howard, 1,614 ft. from S, 1,921 ft. from W, S 260 ac. of E¼, Finess Robertson Sur., 3 mi. SW Spanish Fort, dry, T.D. 2,765 ft.

WEST CENTRAL TEXAS

ABILENE, Tex. — Another Ellenburger test for eastern Shackelford

DAILY AVERAGE PRODUCTION FOR WEEK

	Oct. 16 crude oil	Distillate, allied products	Oct. PAW quota all oils	Oct. 9 crude oil
Arkansas	78,365	4,000	81,700	78,450
California	788,650	46,000	832,000	769,500
Colorado	7,045	.....	7,000	7,000
Eastern fields	72,600	6,000	87,200	78,100
Illinois	235,950	11,500	219,500	235,000
Indiana	14,150	.....	13,800	14,100
Kansas	296,950	4,900	300,000	265,600
Kentucky	26,550	2,200	26,600	22,675
Louisiana	360,030	27,000	375,700	360,525
North Louisiana	81,030	.....	.....	81,525
Louisiana Gulf Coast	279,000	.....	.....	279,000
Michigan	55,100	100	59,100	54,700
Mississippi	46,330	.....	50,000	47,570
Montana	22,580	300	23,400	25,400
Nebraska	1,750	.....	1,800	1,750
New Mexico	109,300	5,400	116,600	109,000
Oklahoma	326,450	27,000	345,700	326,850
Texas	1,891,900	116,000	1,999,000	1,891,900
East Texas	368,700	.....	.....	368,700
West Texas	354,050	.....	.....	354,050
North Central Texas	138,300	.....	.....	138,300
East Central Texas	135,250	.....	.....	135,250
Texas Panhandle	88,100	.....	.....	88,100
Texas Gulf Coast	708,350	.....	.....	708,350
Southwest Texas	99,150	.....	.....	99,150
Wyoming	104,335	2,000	99,600	101,650
Total United States	4,438,035	252,400	4,638,700	4,389,970

Total production January 1-October 16, 1943 ..... 1,168,135,335 bbl.
Same period last year ..... 1,123,859,300 bbl.

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County was announced last week, making two active tests in the area. The new try will be Phillips Petroleum Co. 1 Buford, 1,950 ft. from the north line and 200 ft. from the west line of Section 29, Blind Asylum Land, on the west edge of the Ibex shallow pool, 5 miles northwest of Jones & Stasney 1 Evans, which is drilling below 1,500 ft. for the Ellenburger.

In Stephens County, Texas Pacific Coal & Oil Co. 1-C Brown was completed for a flow of 165 bbl. in 5 hours from Mississippi lime, and location for No. 2-C was made 990 ft. southeast.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Brown County: Guyle Greynolds 1-B Annie Innes, 450 ft. from S, 675 ft. from W. Sec. 36, B.B.B.&C. Ry. Sur., dry, T.D 1,059 ft.

A. J. Rife 1 M. T. Perkinson, Blk. 72 Brown County School Land Sur., 660 ft. N and E of SW cor. 536-ac. tract dry, T.D. 1,927 ft.

Jones County: Green, Jones & Hull 1 J. H. Commons, 1,500 ft. from E, 800 ft. from S, Sec. 8, Blk. 4, A. W. Hill Sur., dry T.D. 1,785 ft.

Stephens County: Auto-Ordnance 1 M. F. Graham est., 1,401 ft. from S and W Sec. 1,097, T.E.&L. Sur., 2 mi. E, 7 mi N Caddo, dry, T.D. 4,207 ft.

Texas Pacific Coal & Oil 1-C Brown. 3,000 ft. from N, 268 ft. from W, Sec. 114, B.B.B.&C. Ry. Sur., flow 1,320 bbl. Mississippi lime pay 4,155-73 ft., acid 1,000 gal., T.D. 4,173 ft. Discovery of new pay.

Taylor County: Lewis Production 1 N. D Teaff, 330 ft. from N and E, Blk. 9 Lge. 122, A.R. Willis Sur., dry, T.D. 2,755 ft.

EASTERN TEXAS

Rodessa Pay Yields Oil In Tri-State Outpost

DALLAS, Tex.—Oil production for the Tri-Cities gas-distillate field of southwest Henderson was assured at Stanolind Oil & Gas Co. 1-E Tri-Cities unit, in Block 13, Jacob Trator Survey, 4,500 ft. southwest of Stanolind 1-B Tri-Cities, and about 1½ miles south of British-American Oil Producting Co. 1 Young, the discovery well. Casing was perforated with 300 shots from 7,610-40 ft., the Rodessa section, and was treated with 2,000 gal. of acid with 1,700 lb. pressure. The well then flowed 23 bbl. of 44.3-gravity oil in 12 hours through 3-in. open tubing, with casing pressure of 1,240 lb.

DEEP TESTS

Franklin County: Humble Oil & Refining Co. 1 J. F. Hogue, Humphries Survey, taking drill-stem test at 7,174 ft., possibly in Rodessa section. Humble 1 Solon King, northwest outpost to New Hope pool, elevation 370 ft., topped Paluxy at 5,815 ft.

Hunt County.—Humble 1 Rutherford, Lindsey Survey, was drilling below 6,110 ft.

Morris County: Humble 1 H. N. Wright, Story Survey, topped Cotton Valley at 8,936 ft., and drilled below 9,000 ft.

Rains County: Humble 1 Mainard, G. E. Beard Survey, Paluxy 6,068 ft., showed salt water on drill-stem test, drilling 7,600 ft.

Smith County.—Skelly Oil Co. 1 Chisum, Hawkins Survey, 2 miles southeast of Sand Flat, had Paluxy at 6,945-55 ft., and is coring below 6,980 ft.

Van Zandt County.—Superior Oil Co. 1 C. A. Groves, Van Sickle Survey, 4½ miles north of Canton, is drilling at 8,203 ft.

LOUISIANA GULF

Second Reddell Well Preparing for New Test

NEW ORLEANS, La. — Continental Oil Co. and Humble Oil & Refining Co. were preparing for a new test of productive possibilities at 3 Pardee Lumber Co., in the Reddell area, Evangeline Parish, 20-4s-1w, after squeezing off perforations at 11,468-76 ft., through which the well had shown gas and distillate. Pan American Production Co. continued to core deeper at 10,550 ft. into the Wilcox in 3 Crowell Land & Mineral Corp., 35-3s-1w, north of the west flank Wilcox production at Pine Prairie.

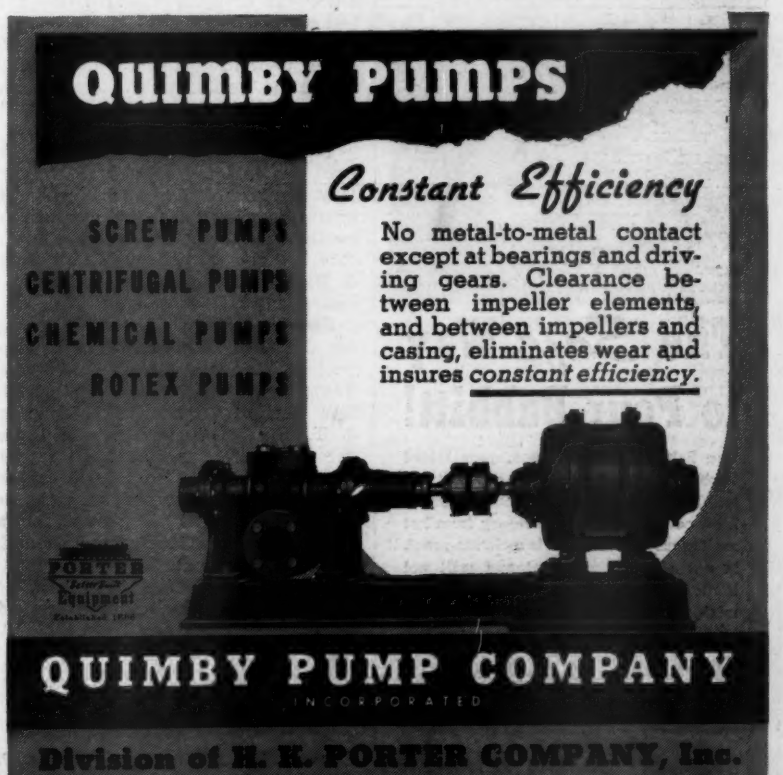
Acadia Parish.—Sun Oil Co. 1 W. L. Trimble, 31-9s-1w, northeast of the Egan area discovery well, remained shut down at 10,640 ft., after attempting to blow out through the stuffing box. This well had been running about level with the discovery and this pressure evidently came from the discovery sand. The discovery well had been completed through perforations at 10,610-25 ft.

Cameron Parish.—Pure Oil Co. is preparing to go deeper in the 1-State-Snake Lake, 25-13s-3w, a wildcat in the extreme east end of the parish. A string of 7⅝-in. protection casing was set at 10,165 ft.

St. James Parish.—Humble completed the 1-B Canal Bank & Trust Co., 7-11s-5e, at Hester, classified as a gas well with flow of about 35 bbl. of distillate per day, from perforations above plugged depth of 10,537 ft. The company rigged up the 2 Colonial Sugars Co., 1-11s-5e, after moving in rig from the gas well.

Terrebonne Parish.—Humble 4 Continental Land & Fur Co., Deer Island area, is drilling at 11,415 ft. in hard sandy shale.

St. Landry Parish. — J. S. Abercrombie and Atlatl Roy Co. 1 Stelly unit, wildcat in the Sunset area, a mile southeast of the 1 Charles-Com-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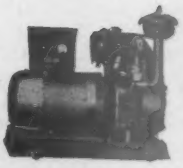

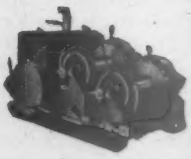

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munity dry hole, was drilling at 9,570 ft.

LOUISIANA GULF COAST WILDCAT COMPLETIONS

Iberia Parish: Texas Co. 5 State-Rabbit Island, in Atchafalaya Bay, dry at 9,930 ft.

Lafayette Parish: Stanolind Oil & Gas Co. 1 Melancon et al Unit, 43-9s-5e, north flank of Anse la Butte dome, abandoned after tests failed to show commercially. Last test was made in perforations 9,638-43 ft.

PERMIAN BASIN

Winkler County Well Finds Oil in Devonian

MIDLAND, Tex.—A fourth producing zone is indicated in the northern Winkler County fields at Magnolia Petroleum Co. 21 State-Walton, SE SW Section 4, Block B-3, Public School Land, ¾ mile south by east of the Kermit-Ellenberger discovery. This well topped the Devonian chert at 8,220 ft., with fractures from 8,273-81 ft., developing a heavy flow of gas, threatening to blow out, and tubing was run under pressure-control head. Casing had been set at 8,273 ft. The flow of gas was killed and at last report the well was circulating at total depth 8,281 ft.

The Devonian does not produce anywhere in the Permian basin area, but small shows of oil were encountered in it at Gulf 103 McElroy, McElroy pool in Upton County. Should this zone prove productive, it will add another objective below the Permian for deep wells.

Two more wells in the Keystone pool are to be deepened to the new Holt horizon of the Clear Fork group of the Permian series, being south and southwest offsets to the discovery in this horizon, which was Richardson & Bass 4 Walton. This pay comes in below 4,800 ft.

Reeves County.—A new discovery for the Delaware basin was in prospect at Standard Oil Co. of Texas 1 Texas and Pacific Lands Trust, SE NW Section 47, Block 57, Township 2, T.&P. Ry. Survey, which topped the Delaware sand at 2,850 ft., and shot with 440 qt. from 2,970 to 3,090 ft. Swabbing recovered an estimated 15 bbl. oil and 50 bbl. salt water per day. Pump was being installed for a production test. This well is 1¾ miles southeast of World Oil Co. 1 Texas Pacific, which showed an estimated 10 bbl. per day from the Delaware, but was abandoned at 3,768 ft. It is 6 miles east by north of World Oil Co. 1 Biggs, which had show of oil from 2,610-15 ft., but was dry at 3,005 ft., and 7 miles southwest of General Crude Oil Co. 1 Texas Pacific, which showed for 25 bbl. per day at 3,240 ft. Standard of Texas staked location for a second test 660 ft. from south and east of Section 47, Block 57, Township 2, T.&P. Ry. Survey, ¾ mile southeast of the possible discovery.

Andrews County.—The Texas Co. 1 John Mabee, new discovery in southeast Andrews County, was being put on pump after making swabbing test, recovered 150 bbl. in 11½ hours, at the rate of 14.8 bbl. per hour during the last 2 hours. Locations have been made for two new tests on the block, No. 2 being 5,800 ft. southwest of the discovery, and No. 3 being about the same distance northeast of the discovery.

Gaines County.—Honolulu Oil Co. 1 Homann, SE SE Section 96, Block G, W.T.R.R. Co. Survey, was maintaining high structural position in topping brown lime 220 ft. higher than it was logged in Gulf 1 Kottwitz, a dry hole 4 miles north. The Texas Co. 1 Parmer County looked disappointing in drilling below 6,000 ft., showing sulfur water in Seminole pay at 5,413-31 ft.

WEST TEXAS WILDCAT COMPLETIONS

Pecos County: Choate & Brown 1-15 University, NW NW Sec. 15, Blk. 20, University Sur., elev. 2,559 ft., pumped 10 bbl., sand pay 1,355 ft., T. D. 1,368 ft. Discovery.

Sutton County: M. C. Moore et al 1 C. D. Wyatt, 660 ft. from N and W, Sec. 7, Blk. 6, T.W.N.T. Ry. Sur., elev. 2,311 ft., Ellenburger 4,238 ft., dry, T.D. 4,436 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M. — A deep wildcat test, scheduled to go to Ellenburger or granite, in Roosevelt County, will be announced next week. It will be drilled by Continental Oil Co., National Refining Co., et al, in SE SE 20-7s-35e, 6 miles south of New Hope, 3½ miles northwest of Milnesand, and 2 miles northwest of a dry hole drilled by Shell Oil Co. to 7,979 ft. in May 1939. The test will be drilled on a unitized block.

Lea County. — Skelly Oil Co. 1-U State, 5-22s-35e, west of the West Eunice field, showed indications of opening a new producing spot when it swabbed 58 bbl. of oil after drilling plug at 3,885 ft., and filled 1,000 ft. with oil in 5 hours from pay section at 4,055-99 ft. The test was drill-

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ing ahead to take more of the pay before completion.

SOUTHEAST NEW MEXICO WILDCAT COMPLETIONS

Eddy County: J. R. Miller 1 Kelley, NE NE SW 2-18s-25e, dry, T.D. 1,101 ft.

Forrest R. Levers 1 Levers, NE NW 25-20s-28e, 5 mi. W. Getty pool, dry. T.D 971 ft.

PANHANDLE FIELDS

AMARILLO, Tex.—Canadian River Gas Co. will drill a deep test in the gas field near Amarillo at its 8-A Masterson, 6,501 ft, from north, 1,065 ft. from west, Section 78, Block 47, H.&T.C. Ry. Survey.

In Donley County, Stanolind Oil & Gas 1 Broome is drilling below 1,500 ft., and in Oldham County the same company is making hole below surface casing. Stanolind 1 Jarrell, Parmer County, is drilling below 6,650 ft.

TEXAS GULF COAST

Stowell and Blue Ridge Outposts Started

HOUSTON, Tex.—Thirteen new locations announced during the past week in the Texas Upper Gulf Coast district, included five important wildcat tests.

Two extension tests to proven production were announced. One was for Gulf Oil Corp. 1 Horace Williams, west of the Stowell field production and falling in Chambers County, and the other by Windsor Oil Co. on Bassett Blakely land in Edward Drew Survey, Lot 7, Section G, a northeast flank test at Blue Ridge in Fort Bend County.

Liberty County.—No official information has yet been released from William Helis 1 Hirsch estate, prospective discovery well about 6 miles southeast of Devers in Liberty County, but it has made at least one test, reported at 7,766-78 ft. Later these perforations were being squeezed off to reperforate for a new test.

Harris County.—Texas Co. has made a dual completion in 52 Stevenson, Yegua discovery well of the Humble (deep) field, originally completed through perforations at 5,320-35 ft. On dual completion it flowed 254 bbl. daily of 44-gravity oil through 10/64-in. choke from sand topped at 5,155 ft., and flowed 279.18 bbl. daily of 44-gravity oil through 10/64-in. choke from the discovery sand topped at 5,271 ft.

Colorado County.—Shell Oil Co., Inc., set 5½-in. casing in 1 Ella B Thompson estate, Samuel Kennelly Survey, Mustang Creek area, 1½ miles north of the Garwood townsite, is at total depth of 11,525 ft. The hole originally drilled to 11,183 ft., was plugged back and sidetracked but reentered the old hole around 9,914 ft., cleaned out old hole and deepened to present depth. This wildcat has been credited with several shows in the Wilcox zone.

Galveston County.—Jack W. Frazier, Ray Ranger and Weber Ogden 1 C. L. Cooper et al Unit, a wildcat in Section 13, I.&G.N. Survey A-601, northeast of Algoa townsite, is drilling at 9,066 ft. in shale. Stanolind Oil & Gas Co. 9 John A. Hulen, west extension test at Alta Loma, and separated from the field by a dry hole, is drilling at 9,050 ft. in shale.

Polk County.—Humble Oil & Refining Co. 3-B Carter, a deep Wilcox wildcat out on northwest flank of Segno dome, drilling at 7,765 ft. in sandy shale.

San Jacinto County.—Navarro Oil Co. 1 Roberts Co., a Wilcox wildcat 3 miles southwest of Shepherd townsite, is drilling below 7,400 ft.

Tyler County.—Humble is rigging up on 1 Denman Kountze et al, a wildcat 1 mile northwest of Rockland townsite, and southwest of the Rockland field, in Emily Smyth Survey A-792. It is to go to 8,500 ft., which will carry it several thousand feet below top of the Wilcox zone.

TEXAS UPPER GULF COAST WILDCAT COMPLETIONS

Brazos County: Phillips Petroleum Co. 1

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Dona Holloway, Wm. Devers Sur., 2½ mi. NW of Millican, dry at 3,638 ft.

Fort Bend County: Gulf Oil Corp. 7 Lillian Scanlan et al, in Wm. Hall Sur., southeast of production at Thompson field, dry at 8,508 ft.

Jefferson County: Glenn H. McCarthy et al 1 Marrs-McLean, 1¼ mi. northeast of Stawell field, dry at 10,340 ft.

ROCKY MOUNTAIN

Gebo Dome Discovery May Develop Into Major Field

DENVER, Colo. — Wyoming, which led the country in the first half of 1943 in new reserves through primary discoveries and extension of proven fields, this week gave promise of holding that position for the remainder of the year. A new pool of major importance has been opened on the Gebo dome, Hot Springs County, on the southern rim of the Big Horn basin, in the Continental Oil Co. 1 Gebo unit, SW NW SE 23-44n-95w. It is a primary discovery in the Embar formation of Permian age. The Embar was topped at 4,735 ft. The formation was cored from 4,338 to 4,784 ft., from which 46 ft. of saturated core was recovered. A drill-stem test at this depth showed seven stands of oil in 15 minutes. An additional 61 ft. of saturated sand then was cored to 4,845 ft., where another test was made, the tester being seated at 4,784 ft. With tester open a fraction less than 15 minutes, it resulted in the recovery of 45 stands of fluid, of which 23 stands were clean oil and 22 stands were oil and drilling mud.

Samples of the clean oil tested by the U. S. Geological Survey showed a gravity of 30° A.P.I. scale, and is reported to have shown a lesser sulfur content than the black oils at Elk Basin. Drilling then was resumed with the intention of testing the Tensleep of Pennsylvanian age, the principal producing horizon at Elk Basin and other fields in the Big Horn basin. At last report it was coring at 4,905 ft., 60 ft. in the shale break between the Embar and Tensleep. No official estimate of the probable capacity of the well in the Embar was made, but unofficial reports on the showing in the two tests from the 107 ft. of saturated sand place it at between 5,000 and 6,000 bbl.

The Gebo dome is located at the extreme southern end of the large horseshoe-shaped Big Horn basin, 85 miles south and 30 miles east of the Elk Basin field, which straddles the Colorado-Wyoming boundary, and 15 miles north of the town of Thermopolis. Around the western rim of the basin south from Elk Basin are the Oregon Basin, Little Buffalo Basin, Grass Creek, and other well-known pools. The structure has been known for many years and has had a rather varied career. Prospectors began locating claims as far back as 1913 under the old placer mining laws, and at that time the area was favorably considered.

On December 11, 1914, the general land office withdrew 9,080 acres of the public domain covering the structure from entry. Some of the locators ceased annual assessment work on their claims following the withdrawal, and others maintained the work. Litigation followed. Then the mineral leasing act of February 25, 1920, was approved, and the way was paved for the adjustment of the many claims through the granting of prospecting permits. When the withdrawn land was opened under the leasing act, there were 87 individuals and companies, including most of the major operators in Wyoming, in 32 groups, who laid claim to it, and in the following five years $350,000 was expended by various interests in attempts to control it. The Department of the Interior divided the land into six or seven parcels and began issuing permits. The Mountain States Oil Co., in which the Utah Oil Refining Co. and the Ohio Oil Co. held interests, drilled the first well in 1926 to the south of the present Continental discovery. It ran out of hole and was abandoned at 2,902 ft. in the Morrison formation. The sands in the Frontier, which at that time were the principal producing horizons in Wyoming, contained water. Flowing water was encountered in the Dakota at 2,690-2,745 ft., and a little gas was found in the Lakota. This well subsequently was shown to be off structure, but at the time it discouraged all additional prospecting and interest lagged.

The discovery of prolific production in the Embar-Tensleep in later years renewed interest in it. C. S. (Red) Hill, of Denver, suceeded in blocking up the entire area and turned it to Continental. The area was unitized and approved by the secretary of the interior, there being approximately 3,600 acres within the unit which is controlled 100 per cent by Continental. In addition, the company has several thousand acres in solid blocks outside the unitized area.

COLORADO WILDCAT COMPLETION

Chrome district, Archuleta County: Phillips Petroleum Co. 1 Crowley, SW SW SW 12-32n-1e, abandoned in quartzite at 1,625 ft., after testing Dakota series and Morrison.

MONTANA WILDCAT COMPLETIONS

Aloe Block, Toole County: Northern Ordnance, Inc., 1 Kiesser, C NW NW 30-34n-3w, T.D. 1,794 ft., plugged and abandoned after testing Madison lime.

East Kevin, Toole County: Northern Ordnance, Inc., 1 Byrne, C NW SW 2-34n-2e, T.D. 2,158 ft., top Kootenai 1,506 ft., Ribbon sand 1,900-2,010 ft., top of Madison 2,149 ft., plugged and abandoned.

Kevin-Sunburst, Toole County: R. G. Parrant 1 McAlpine, SW NW SE 25-37n-3w, T.D. 2,117 ft., sulfur water in Ellis-Madison at 2,082-88 ft., plugged and abandoned.

OHIO, KENTUCKY

Record Production Obtained From Gallia County Gasser

ZANESVILLE, Ohio. — The largest gas well yet completed in the southern end of the Clinton producing belt was finished this week by the Trenton Gas Co. on the Clint Litton tract in Section 18, Greenfield Township, Gallia County. The well gaged 7,500,000 cu. ft. at 2,906-24 ft., and had pressure of 1,030 lb. The well extends the Black Fork pool ½ mile to the northeast.

The West Lafayette pool in Medina County was extended a location to the north by the Ohio Fuel Gas Co.'s Gilbert well in Lot 5, Lafayette Township, having an initial open flow of 3,720,000 cu. ft. and pressure of 1,220 lb. from the Clinton at 3,113 ft.

The South Wayne pool in Muskingum County was extended to the west by the Ohio Fuel's Graham well in Section 2, Wayne Township. The well gaged 2,940,000 cu. ft. from the Clinton sand at 3,990 to 4,039 ft.

OHIO WILDCAT COMPLETIONS

Gallia County, Morgan Township: Peavey 1 J. M. Grover, Sec. 20, Berea, 1,423-28 ft., dry, T.D. 1,428 ft.

Lorain County: Elyria Township: Edson & Son 1 Cath. Rauscher, Lot 1, Clinton, 2,400-06 ft., dry, T.D. 2,440 ft.

Noble County, Noble Township: Gregg Oil 1 Gregg & Lowe, Sec. 24, Berea 1,504-29 ft., dry, T.D. 1,539 ft.

Perry County, Pike Township: Kachelmacher 1 T. A. Kinsel, Sec. 26, Clinton 3,513-46 ft., dry, T.D. 3,704 ft.

Tuscarawas County, Warwick Township: Benedum & Trees 1 J. P. Porcher, Sec. 11, Clinton, 4,866 to 4,912 ft., dry, T.D. 5,049 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—Two gas wells were completed in the eastern Kentucky area last week. Operations, showing a slight upturn, also reveal that a number of other wells are nearing completion stage.

WESTERN KENTUCKY

OWENSBORO, Ky.—Sohio Producing Co. completed the best well of the week in western Kentucky, 3 C. Hancock in Union County, which started at 1,180 bbl. a day, flowing naturally from Levias lime at 2,494-98 ft. and McClosky lime at 2,529-33 ft., total depth 2,542 ft. Two oil wells and five dry holes were reported during the week.

WESTERN KENTUCKY WILDCAT COMPLETIONS

Henderson County: Sun 1 Sam Duncan, near Dixie, dry at 2,709 ft., Glen Dean 2,001 ft., Barlow 2,267-72 ft., Ste. Genevieve 2,597 ft.

Hopkins County: Papoose Oil 1 Roy Dorris, 3 mi. SW of Providence, dry at 2,055 ft., upper Menard 1,057 ft., McClosky 1,872-74 ft., 1,879-83 and 1,927-30 ft., St. Louis 2,050 ft.

McLean County: H. C. Hume and Sohio 1 T. E. Bridwell, 1½ mi. NE of Island, dry at 2,005 ft., upper Kincaid 1,059 ft., Barlow 1,636-42 ft., Ste. Genevieve 1,794 ft.

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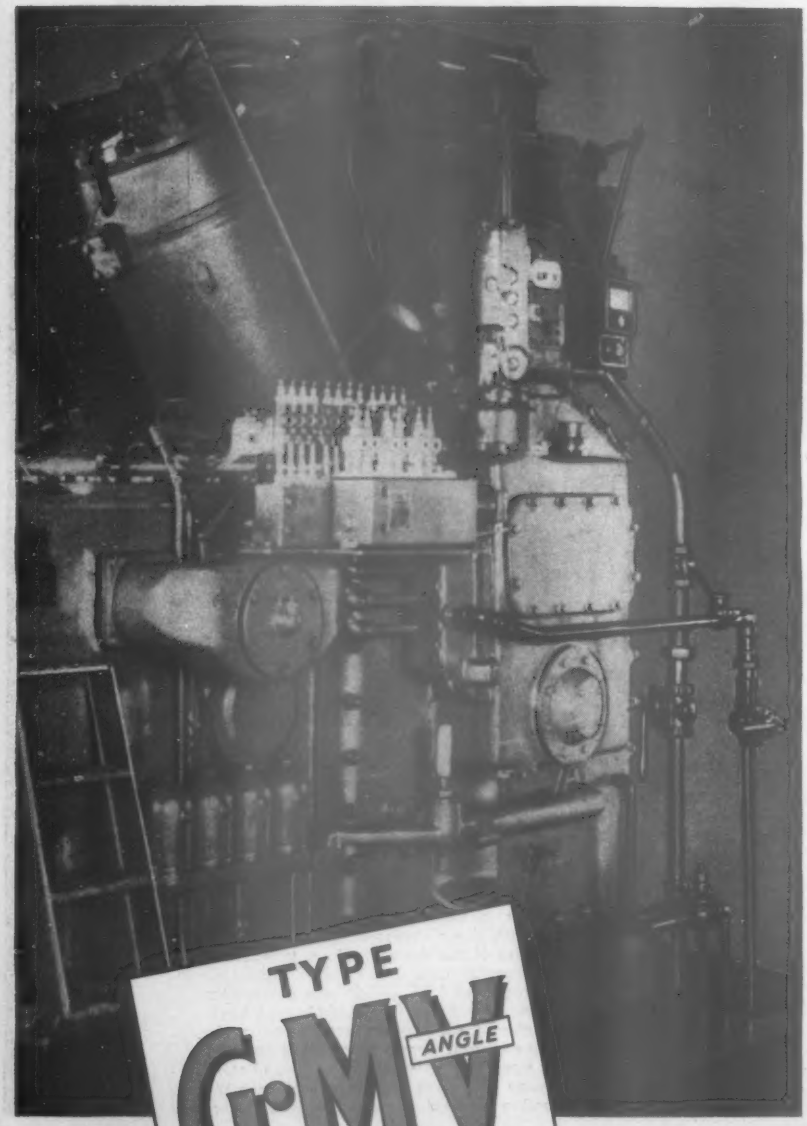

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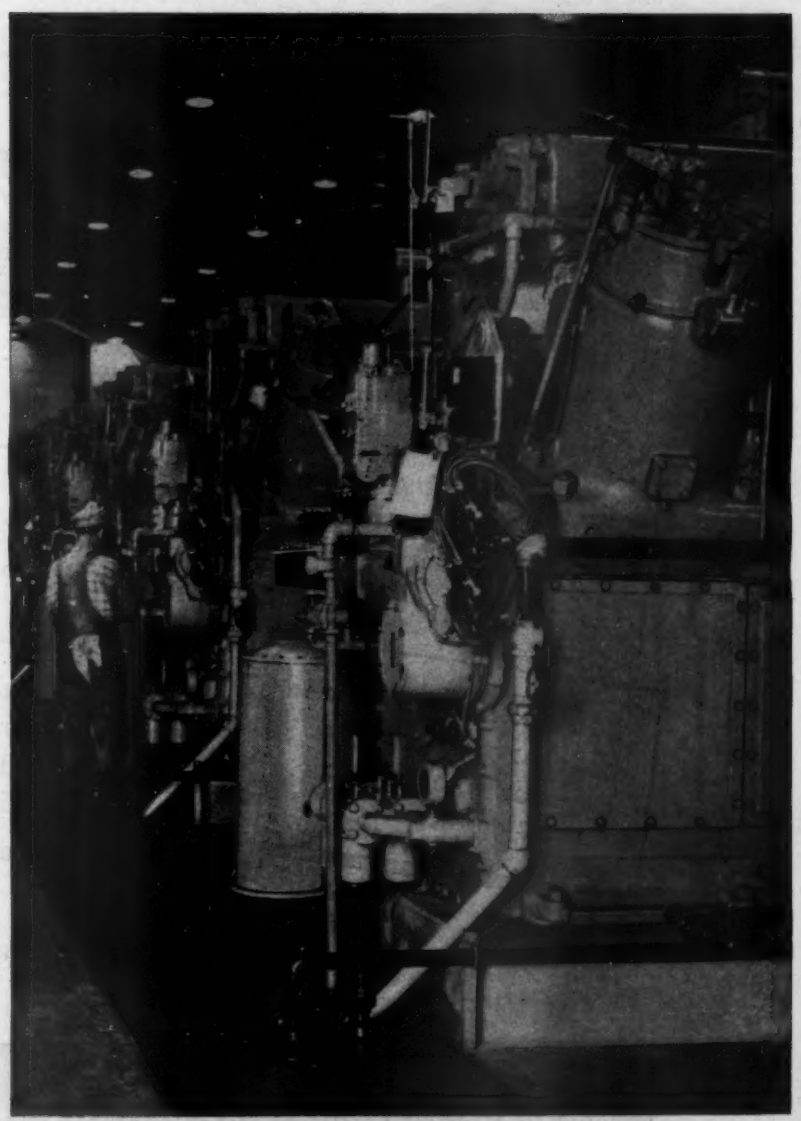

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CANADIAN FIELDS

Vermilion Field Gets Flowing Well

CHATHAM, Ont.—In the Vermilion field, eastern Alberta, Cannar Oils 17, 30-50-5w4, finished around 1,830 ft. as a flowing well, making a flush of 350 bbl. in the first 24 hours. This is the largest flowing well in Canada outside Turner Valley and one of the first flowing wells in the Vermilion field, where practically all the wells have been pumpers, though Vermilalta 2 started flowing 60 bbl. a day and is now pumping 35 bbl. Vermilalta 4, 29-50-5w, offsetting Cannar 17 to the west, is nearing completion, and Vermilalta 3, same section, has finished at 1,850 ft. and is testing production. Recent Vermilion completions have been much better wells as a rule than the earlier producers. The output of the field is expected to run better than 20,000 bbl. this month.

Pekisko.—On the Pekisko structure, south of Turner Valley, Highwood Pekisko Petroleums, a recently organized subsidiary of Highwood-Sarcee Oils, is preparing to resume work on Pekisko Hills 1, LSD 6, 6-17-2w5. This test has been standing in the Banff shales at 4,400 ft. and derrick and cable-tool equipment are being moved in to deepen the hole to test the Devonian limestone. Location is more than 6 miles south and slightly west of Brown Oil Corp. 6, the most southerly producer in Turner Valley.

Herronton.—In the Herronton area east of Turner Valley, Shell-McWilliam 1, LSD 8, 1-21-26w4, has been abandoned at 8,098 ft. after striking sulfur water in the Devonian limestone.

Pinhorn.—Near Pinhorn, in southern Alberta just north of the Sweetgrass Hills in Montana, equipment is being moved in for McColl-Frontenac 6818, LSD 6, 8-1-8w4. This is the first test by the McColl-Fontenac company of a reservation of 80,000 acres recently secured in southern Alberta. Location is about 1½ miles north of the international boundary. Numerous oil shows and substantial gas production have been secured in previous tests in the same general area.

Ontario.—In northern Ontario, contract has been let by MacDyke Oil & Mining Industries, Ltd., for a commercial test on its acreage in the Moose River Basin, south of James Bay. The company's holdings of 9 sq. miles are in the vicinity of the T. & N. O. Railway, north of Cochrane. Diamond drill structure tests have been carried on for the past year, indicating extensive oil-shale deposits, development of which is being studied. Free oil is expected around 1,500 ft. William Dykes, president of the company; H. Thomson Leslie, president of Mining Research Corp., consulting engineers, and Charles Perdue, of Central Oil & Gas Well Drilling Co., are in the north making location for No. 1 well and arranging for construction of camps and derrick.

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APPALACHIAN FIELDS

Deep Chestnut Ridge Test To Be Abandoned

PITTSBURGH, Pa. — On Chestnut Ridge, in Georges Township, Fayette County, Peoples Natural Gas Co. is abandoning the test on the Walters farm at a depth of 8,115 ft. The well was shot at 7,788-7,828 ft. The results were very discouraging.

Butler County. — In Mercer Township, Butler County, Manufacturers Light & Heat Co. is nearing the Newburg sand in the test on the J. W. Hockenberry farm. It has reached 5,600 ft.

Westmoreland County. — In Derry Township, Westmoreland County, the Peoples Natural Gas Co. is drilling at 7,355 ft. in 1 Camilla Giffin. The Tully lime in this well was at 7,235-7,305 ft.

Maryland.—On the Accident dome in Garrett County, William E. Snee et al are drilling at a depth of 3,000 ft. in their test on the De Leon T. Rush farm.

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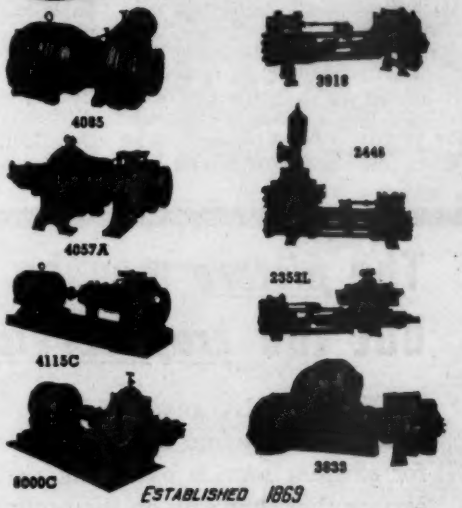

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SOUTHWEST TEXAS

Discoveries Reported in Jim Wells, Duval Counties

CORPUS CHRISTI, Tex.—There was no indication of a let-up in new development in the Southwest Texas district last week and a large per cent of the new work was in unproven or semiproven areas. Southwest Texas wildcatting has been on the upgrade during the past several weeks and in following the lease development it is evident that much more new exploration can be expected in coming weeks.

A new discovery was chalked up by Humble Oil & Refining Co. in the 1 R. R. Mullen, about 7,200 ft. southwest of the North Magnolia City field discovery in Jim Wells County. The new producer gaged 110 bbl. daily on ¼-in. choke with tubing pressure of 50 lb., casing sealed. Total depth is 5,785 ft., plugged back to 4,874 ft. The well had recovered some 23 gravity oil, no water, light pressure on drill-stem test at 3,630-38 ft., above the North Magnolia City pay zone before making final completion.

Another discovery for the district was Taylor Refining Co. 1-C P. G. de Garcia, about 1 mile west of the Cadena field in Duval County, which flowed gas with an oil spray. It made an estimated 5,000,000 cu. ft. of gas daily from perforations at 4,862-70 ft. and was shut in. Total depth is 6,025 ft., and 7-in. pipe is set at 4,954 ft. This well is 660 ft. out of the northeast corner of the F. Chapa Survey No. 55, A-690.

A wildcat which is expected to open gas-condensate production is Transwestern Oil Co. and H. B. Zachry Co. 1 Holzmark, Samual May Survey, 7,600 ft. southeast from the Mineral field deep discovery and midway between the old shallow Voss and Foley fields in northwestern Bee County. It flowed 235,000 cu. ft. of gas with about 10 bbl. of 46.8-gravity condensate per day on ⅛-in. choke with tubing pressure of 1,000 lb., and casing pressure of 1,700 lb. from perforations at 8,530-40 ft., in sand 8,525-45 ft. Total depth is 8,919 ft., 5½-in. pipe is set at 8,915 ft.

Starr County.—T. E. Stephens 1 Gonzales heirs, 11 miles northwest of Roma, in Share 232, Porcion 69, Juris of Mier Survey, was taken over by Kirkpatrick Drilling Co. with Stephens retaining a half interest. Liner was being set for completion at the 4,800-ft. level, below the 5½-in. casing which was set to 4,617 ft., total depth 5,379 ft.

Brooks County.—Standard Oil Co. of Texas 1 Justo Chavana et al, a wildcat in Brooks County, blew out of control several days ago and caught fire. This is about 3½ miles southeast of Alta Mesa. The well topped a gas sand at 7,285 ft., and at 7,288 ft. blew out with drill pipe in the hole. M. M. Kinley Co. took charge to extinguish the fire and kill the gas flow.

De Witt County.—Adams Oil & Gas Co. 1 H. Wuensch, James Foster Survey A-176, limited the Yorktown field on the northeast side. It was abandoned at 8,770 ft., after running an electrical log which failed to indicate commercial showings of oil or gas. It had only one small sand with gas odor in the discovery pay level at 7,122-33 ft., finding salt water in sands below. It was located 4,600 ft. northeast of the condensate production. Rig from this well will be moved to Adams' new wildcat about 2¼ miles southwest of the Yorktown field discovery, about a mile southeast of Yorktown townsite.

LOWER GULF COAST WILDCAT COMPLETION

San Patricio County: Seaboard Oil Co. 3-B C. C. Parker, ½ mi. east of production at Odem, dry at 7,200 ft.

SOUTH TEXAS WILDCAT COMPLETION

Duval County: Frank & George Frankel 1 Flory D. Lowe, 2 mi. SE of the Labbe field, dry at 3,432 ft.

SOUTH CENTRAL TEXAS WILDCAT COMPLETION

Wilson County: Ralph E. Fair 1 Walter Mc Kinney, 3½ mi. S of Nixon, dry at 4,925 ft.

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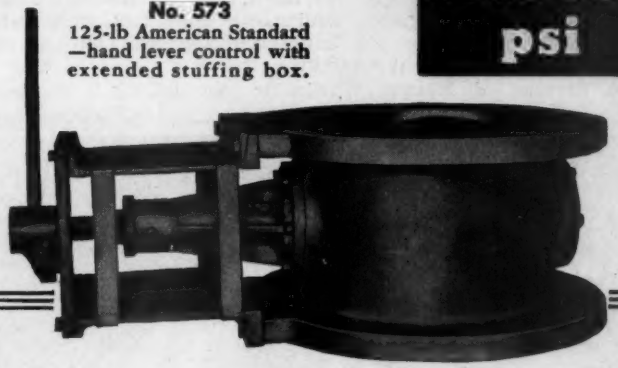

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CALIFORNIA

East Strand Outpost Nearing Objective

LOS ANGELES, Calif.—Continental Oil Co.'s successful completion of a discovery well in the McClung district of Kern County, southeast of the Greeley field, rates its wildcat, 1-H Kern County Land, southeast of the East Strand field, as an important operation. The company's 1-H Kern County Land, in 18-30s-26e, is already making hole and should reach the objective, the Stevens of Miocene age, within the next few weeks. Union Oil Co. is also drilling west of the Rio Bravo field where the expectation is that the Stevens may prove productive.

Tide Water Associated Oil Co. has moved north of Fruitvale for its newest wildcat and is making hole in 54-6 Kern County Land in 6-29s-27e.

Standard Oil Co. of California's projected deep test on the Franco Western property in the old McKittrick field appears to have considerable merit. As is the case with Union's holdings at McKittrick, Standard of California's lease covers only the deep rights.

Similar deep drilling is also being done by Standard of California in the Elk Hills field, one well being scheduled for completion in the Stevens and the other projected below this horizon.

At the southeastern end of the Greeley field in Kern County, Standard of California has reached the critical depth in 1 Wegis in 21-29s-26e and the outcome of this deep test should be known shortly. This well would extend the limits of production at Greeley if completed as a commercial producer.

The discovery of production in the McClung district of Kern County by Continental several weeks ago and the development of production in the Pleasant Valley field of Fresno County represent successful trend drilling. The Tejon district in southern San Joaquin Valley in Kern County which has been the scene of considerable unsuccessful drilling in past years has attracted Richfield Oil Corp. again and the company has started its fifth wildcat on a large block of leases. Tejon Oil Co., which is also drilling in this general region, reports finding the Vedder sand of Miocene age in its wildcat at 8,973 ft., but the sand to date, slightly below 9,000 ft., has been void of showings. Richfield has recently started a wildcat in search of commercial gas production about 6 miles east of Stockton in the so-called Delta region in 5-1n-8e. Several gas wells were drilled in the area many years ago.

LOS ANGELES BASIN

Los Angeles County.—Standard of California has landed pipe in 105 Baldwin-Cienega for a test of the Sentous zone of Miocene age in the Inglewood field. The sand appears to be tight. The well is east of the Inglewood fault and would open up considerable acreage for development if productive.

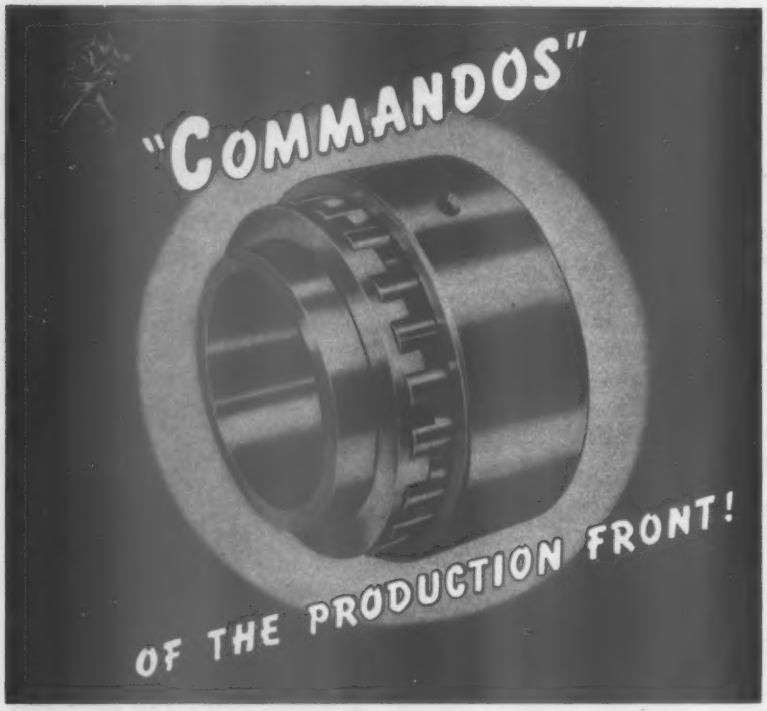
Standard Oil Co. of Texas is making good progress in its first Sentous zone well on the Rubel lease and should reach the top of the pay within the next 2 weeks.

Deep drilling.—Texas Co. has started a projected deep test in the Long Beach field. The well's objective is the De Soto zone of probable middle Miocene age. This deep horizon, which is encountered around 10,000 ft., has been found tight in four wells to date and in this respect is quite similar to the Sentous zone in the Inglewood field.

The latest deep test to be announced is Standard of California 2-27 Kraemer in the Richfield district.

COASTAL DISTRICT

Los Angeles County. — There has been a noticeable tendency during the past few months to engage in drilling operations in the Del Valle field at the extreme western end of the San Martinez section of the pool. Paul Kelley and Jack Hurley recently ex-



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tended the productive limits to the northwest and within the past week the Bankline Oil Co. staked location for 103 Orduno in 18-4n-17w. Northeast of this location, Bankline is drilling an outpost on the Sterry lease and has an oil sand at 5,016 ft. that may result in commercial production. This is above the Sherman or upper zone and may be the equivalent of the Pliocene found in a limited area to the south. In the far eastern end of the Del Valle field, R. E. Havenstrite 1 Liebhart proved to be a relatively small flowing well upon recompletion at 7,670 ft.

Santa Barbara and Ventura.—Union has completed 18 Bell in the Cat Canyon field but it is still testing and no estimate of production has been made. It will be a flowing well, however, as it has over 600 ft. of Miocene open to production. Union has a large reserve in the Miocene at Cat Canyon and to date has concentrated its drilling activities for the most part to offset drilling to protect its Bell property from drainage.

In the Ventura Avenue field, General Petroleum 27 Barnard, a recent completion, flowing through a 7/64-in. bean, has consistently built up pressure and at present shows 4,100 lb. on the tubing and 4,350 lb. on the casing. The lower Pliocene zones at Ventura Avenue have only been tapped and there will be a considerable quantity of crude oil and gas to come from undrilled locations below 9,000 ft. No well in the Ventura Avenue field has yet drilled entirely through the Pliocene. Production possibilities are considered bright down to 15,000 ft. if and when it becomes advisable to drill deeper.

WILDCAT COMPLETIONS

Aliso Canyon district, Los Angeles County: Standard of California 1-1 Frew, 29-3n-16w, abandoned in gray sand, T.D. 5,632 ft., no showings; located 1 mi. W of production in the Aliso Canyon field.

Porterville district, Tulare County: Tide Water Associated 87-11 Porterville, 11-22s-26e, abandoned, T.D. 2,735 ft., no showings.

MISSISSIPPI

Two Discovery Wells Near Completion

JACKSON, Miss.—Interest of Mississippi operators centered on the Cranfield area of Adams County as the California Co. completed 1 National Gas Co. of Louisiana, Inc., as a Wilcox sand producer from perforations at 5,880-84 ft. While still cleaning on 5/32-in. choke, the well flowed 145 bbl. oil in 19 hours with only a trace of mud, and tubing pressure was 370 lb. This wildcat also assured production at the 10,270-ft. level, where it flowed gas-condensate on drill-stem test before plugging back and testing for completion in the Wilcox zone.

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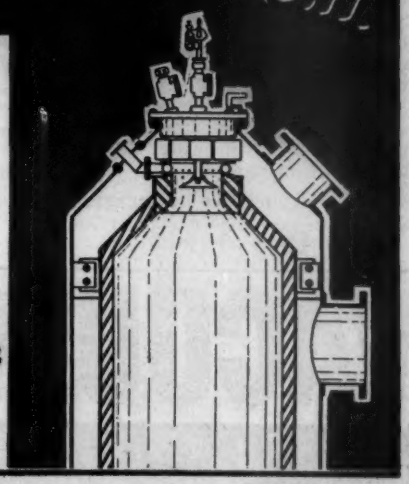

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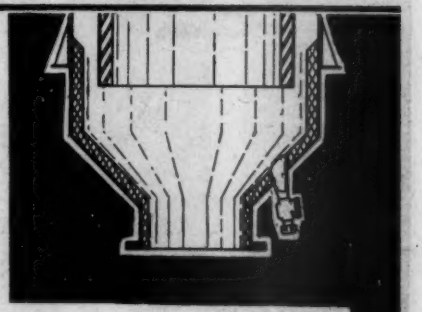

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Operator decided to make final completion in the upper oil zone.

Gulf Refining Co. is completing the 1 Aden Davis, 2-9n-9w, discovery well of the Eucutta area in Wayne County, as a pumper. On preliminary pumping gage it made 198 bbl. of fluid in 24 hours, 25 per cent salt water. This production is from perforations in the Tuscaloosa at 6,666-72 ft. Total depth is 7,100 ft., and 5½-in. casing is set at 6,850 ft. Several attempts had been made to shut off the water and complete as a flowing well.

MISSISSIPPI WILDCAT COMPLETIONS

Lawrence County: Gulf Ref. Co. 1 James A. Cox, 35-7n-10e, dry at 2,771 ft.

FLORIDA

HOUSTON, Tex. — Humble Oil & Refining Co.'s test in the Suniland area, Collier County, Florida, late last week was swabbing in open hole at 11,613-26 ft., total depth 11,626 ft., showing 30 per cent low gravity oil and 60 per cent salt water. Operators say it is just a good show of oil, will not make a well here at bottom, but tests will probably be made higher in the lime.

The wildcat is attracting more than usual interest in all sections of the oil country, because it would be first commercial well for Florida, if it produces. It is in Section 29-48s-30e.

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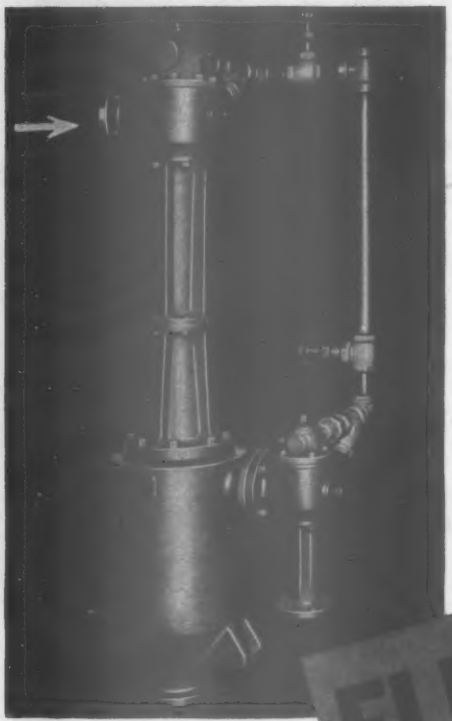

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ILLINOIS

New Wells Average High In Initial Production

CENTRALIA, Ill.—Forty-four wells were completed in Illinois in the past week in review, 31 of the completions being oil wells averaging 180 bbl. per day in initial production and ranging from 7 bbl. to 750 bbl. the first 24 hours. Eleven dry holes were recorded.

The recently opened Bungay pool in Hamilton County supplied some of the largest producers of the week. Ohio Oil Co. 1 E. D. York, NE NE SE 27-4s-7e, flowed 604 bbl. naturally through a ¾-in. choke, producing from Aux Vases pay at 3,308-24 ft., and the same company's 1 E. M. York, SW SW SW 26-4s-7e, made a natural flow of 452 bbl. through ½-in. choke in 24 hours from Aux Vases sand at 3,308-20 ft. National Associated Oil Co. 1-A Rebstock, SW SW NW 26-4s-7e, flowed 230 bbl. initially from Aux Vases sand at 3,291-3,303 ft. This area had one oil well and a dry hole at the beginning of the month.

Olds Drilling Co. completed the largest producer of the week, 1 Long, SE SW SW 9-1s-12w, in the Mount Carmel pool in Wabash County. It started at 750 bbl., after acid, from McClosky lime at 2,314-18 ft., total depth 2,320 ft.

Bell Brothers 1 Indiana National Bank, C E½ NE NE 26-1s-3e, Jefferson County, was not yet a completion but flowed at the rate of 284 bbl. per day from McClosky lime at 2,778-82 and 2,860-69 ft. It is 4 miles from other production and opens a pool.

In Fayette County, a wildcat 4½ miles from other production, looks like a pool opener. It is Wagner & Callihan 1 Littleton, C NE SW 22-5n-4e, which showed 300 ft. of clean oil in a drill-stem test of Benoist sand at 2,342-58 ft.

Nash Redwine 1 H. Casey, NE SW NE 6-3s-4e, Jefferson County, 1 mile from other production, made 180 bbl. in a 12-hour swabbing test of McClosky lime at 2,801-10 ft.

Forty-one new operations were reported in the state during the week, of these, 11 were wildcats.

ILLINOIS WILDCAT COMPLETIONS

Clay County: Robinson & Puckett 1 Gibson estate, SE NE SE 3-4n-7e, dry at 3,030 ft., Menard 2,193 ft.

Cumberland County: Sohio 1 Hibben-Wilde, SE SE NW 15-9n-9e, dry at 2,676 ft. Vienna 2,031 ft., Cypress 2,254 ft., Barlow 2,436 ft., Aux Vases 2,466 ft., Fredonia 2,556 ft.

Edwards County: Texas 1 Shelby-Hayes, C E½ NW SE 10-1n-10e, dry at 3,365 ft. Glen Dean 2,680 ft., Cypress 2,929 ft., McClosky 3,275-3,306 ft., St. Louis 3,324-29 ft.

First National Petroleum Trust 1 Brown, C S½ SW SW 6-2s-11e, 116 bbl. from Aux Vases sand at 3,005-08 ft., shot. T.D. 3,030 ft.

Effingham County: Luttrell 1 E. Tonn, NE NW NW 14-6n-5e, dry at 2,560 ft., Glen

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Hamilton County: Lomelino & Williams 1 Biggerstaff, NE SE NW 14-5s-7e, dry at 3,572 ft., upper Glen Dean 2,705 ft., Cypress 3,013 ft., Weller 3,058 ft., Benoist 3,206 ft., Aux Vases 3,315 ft., Fredonia 3,350-55 ft.

Wabash County: Sunflower 1 Tracy heirs, NE SE SE 12-1n-12w, dry at 1,610 ft., Biehl sand 1,426 ft., Pennsylvanian 1,457 ft.

Magnolia Petroleum Co. 1 Campbell heirs, SE SE NE 7-1s-13w, 34 bbl., Cypress sand 2,034-42 ft., shot, T.D. 2,050 ft. Extends Mount Carmel.

Washington County: E. S. Cumbie 1 Rybacke, C SW NW 7-3s-1w, dry at 1,674 ft., upper Glen Dean 1,040 ft., Cypress 1,247 ft., Benoist 1,414 ft., McClosky 1,640-48 ft.

Wayne County: Robinson & Puckett 1 Little Flower, NE SE NE 27-1s-9e, dry at 3,402 ft., Menard 2,442 ft., Cypress 2,965 ft., Paint Creek 3,062 ft., Paint Creek sand 3,113 ft., Aux Vases 3,216 ft., McClosky 3,328-38 and 3,352-55 ft.

White County: Schoonmaker and Ashland 2 Cowling, NE NE SW 20-2s-14w, 47 bbl., Aux Vases 3,035-52 ft., T.D. 3,057 ft. Extends East Albion.

Skelly Oil 1 E. Ramming, SW SW NE 24-5s-10e, 7 bbl. oil, 30 bbl. water, McClosky lime 3,007-14 ft., 3,073-84 ft., 3,092-95 ft., T.D. 3,120 ft.

MICHIGAN

Four Producing Wells Added to Fork Pool

SAGINAW, Mich.—While four productive wells were completed in Fork Township, Mecosta County, during the past week, Michigan oil operations faired poorly elsewhere in the state with 10 of the 17 completions being dry holes. Six of the failures were wildcats, including one in Saginaw County, one in Shiawassee, and another in Genesee.

Best of the new Fork field producers was Gordon Oil Co. 1 Meier in Section 7, which was completed for nearly 400 bbl. a day, and Sun Oil Co. 7 Murray, which flowed 172 bbl. on choke after acidizing. Sun got a 200-bbl. producer in Section 34 of Cedar Township, Osceola County.

Among the dry holes, deepest was a Pure Oil Co. test in Winterfield Township, Clare County, where the A-1 Bulman was tested to 5,081 ft.

MICHIGAN WILDCAT COMPLETIONS

Clare County, Summerfield Township: Pure 1 Pere Marquette Railroad Co., C S½ SE NW 11-20n-5w, dry, T.D 1,470 ft.

Genesee County, Forest Township: John F. Burton 1 L. T. Lyon, NE NE NE 29-9n-8e, dry in Traverse limestone, T.D. 2,148 ft.

Mecosta County, Grant Township: Chapman Oil 1 State-Grant, C E½ SE SE 29-16n-9w, dry in Monroe, T.D. 3,678 ft.

Ottawa County, Holland Township: Southwest Development 1 Henrietta Elfers, SE SE SE 4-5n-15w, dry in Traverse limestone, T.D. 1,583 ft.

Saginaw County, Maple Grove Township: Charles W. Teater 1 Thomas W. Byrne, C S½ NW NE 11-9n-4e, dry in Dundee, T.D. 2,975 ft.

Shiawassee County, Fairfield Township: Monroe Marks 1 H. Litchfield, SE NE NW 4-8n-1e, dry in Dundee, T.D. 3,003 ft.

LA.-ARK.

Columbia County Deep Wildcat Drilling Ahead

SHREVEPORT, La.—In southwestern Columbia County, Arkansas, about 1½ miles southwest of the town of Taylor, Northern Ordnance Corp.'s deep test was drilling below 10,275 ft. A core at 10,550-58 ft. was not recovered. The well is 1 Waggoner, NW NE 10-19s-23w.

ARKANSAS WILDCAT COMPLETIONS

Little River County: Leo Ochsenbein 1 W. A. Simpson, SW NE SE 35-11s-30w, dry, T.D. 2,086 ft.

Union County: Quinn Oil Co. 1 C. H. Murphy, SW SW 30-16s-14w, dry, T. D. 3,190 ft.

NORTH LOUISIANA WILDCAT COMPLETION

Claiborne Parish: E. C. Johnston 1 Tims, SW SW 12-21n-7w, dry, T.D. 6,012 ft., Pettit porosity 5,580 ft. and 5,655 ft.

Application Made for Water-Disposal Wells at Midway

EL DORADO, Ark.—The first combination salt-water disposal and pressure-maintenance project to be launched in Arkansas, and one of the few such undertakings to be started on a unit basis, is showing results in the Midway field of Lafayette County in its preliminary stages, and is expected to bring about an increase in the ultimate recovery of oil from the pool.

Started on a small scale with one injection well, the program now has the support of all operators in the field, and is scheduled to be expanded if an application filed with the Arkansas Oil and Gas Commission is approved at the statewide hearing this week at Magnolia. The application has been filed by the Barnsdall Oil Co., which will serve as operator for the unit project.

Four main points are made by the operators in connection with the project with more than doubling of the ultimate recovery heading the list. It is estimated that through the use of the salt-water disposal method, the ultimate recovery will be over 65,000,000 bbl., which is more than twice as much as the calculations under normal conditions without water injection.

It is estimated that there will be a material saving through reduced lifting costs, and it is pointed out that there are possibilities for controlling the rate of production without reduced reservoir pressures in addition to the plan for disposal of salt water.

Only one injection well has been used in the Midway project, but the operators are pleased with results to date, and if the commission approves the project, they plan to proceed as rapidly as possible with three additional injection wells, which will give the system an injection capacity of approximately 10,000 bbl. daily.

In connection with results obtained, particularly in the matter of decline of the drop in bottom-hole pressure, an official of the Barnsdall company said:

"We feel that the most important situation to date has been a definite increase in pressure shown by the last survey as compared with approximately ½ lb. per day drop in pressure previous to that time. These results have been increased by the use of one injection well, in which fresh water has been injected at the approximate rate of 2,200 bbl. per day since April 19, 1943."

Relative to the application before the commission, the Barnsdall official said:

"The injection capacity of 10,000 bbl. per day should allow a great deal of flexibility as to the pressure maintained and the rate of withdrawal. As you know salt-water disposal is not the least of our purposes to be obtained and it in itself would justify the expenditure of money which is being undertaken by the operators. While the salt-water disposal has not been of great importance in Midway up to the present time, it naturally would assume such importance at an increasing rate. In addition to the above purposes of this system, we believe great economics will be effected on production due to greatly diminished pumping requirements for individual wells."

One result that may follow approval of the application might be a possible increase in the present allowable of 175 bbl. for each 40-acre tract because of the more efficient operation of the field. There are 39 wells in the field which embraces 1,700 acres, and the pool is largely developed, although a few more wells may be drilled.

KANSAS

Extension Wells Reported For Several Counties

WHILE there were no new pools brought in during the week in Kansas, a number of wildcats found good showings.

Ellis County.—About 2 miles west of the new Leiker pool and between the Rudder and Madden pools, the B. & R. Drilling Co. 1 Wolf, S½ NW NW 16-15-18w, found a 5-ft. saturated section in the Kansas City lime at 3,375-80 ft. and also same saturation in the Arbuckle at 3,602 ft. Operators were drilling ahead below 4,000 ft. Production at this location would serve to link the three areas.

Stafford County.—Skelly Oil Co. 1 Toland, S½ SE SW 25-22-13w, extended the Jordan pool about 1 mile to the southwest when it made a pumping potential of 359 bbl. of oil. Pay zone is the Lansing lime at 3,883-86 ft. After acid treatment it pumped 35 bbl. of oil and 18 bbl. of water in 3 hours.

Rice County.—Phillips Petroleum Co. 1 Valk, NE NE SW 27-18-9w, was shut in for tanks and pumping equipment. Cement plug was drilled at 3,251-56 ft. and a number of 1-hour swabbing tests were made, averaging 20 bbl. of oil. The hole was then plugged back to 3,256 ft. It is a northeast extension to the Ploog pool.

KANSAS WILDCAT COMPLETIONS

Kiowa County: Olson Oil 1-A Price, SW SW 22-28-20w, dry, T.D. 5,031 ft., Lansing 4,315 ft., Mississippi lime 4,925 ft.

Pratt County: Lion Oil Ref. 1 Chitwood, NE SE NW 23-28-12w, flowed 70 bbl. in 9 hr., ¼-in. choke, estimated 40 gravity, potential 2,672 bbl., pay in Simpson at 4,396-99 ft., discovery of Chitwood pool.

Sedgwick County: Beech Aircraft 1 Beech airport, SE SE NW 21-27-2e, dry, T.D. 3,400 ft., Arbuckle 3,378 ft., drilled for gas.

Stafford County: Great Lakes Carbon and Atlantic 1 Eldred, NE SW SW 8-24-14w, dry, T.D. 4,270 ft., Viola 4,103 ft., Simpson 4,175 ft., Arbuckle 4,220 ft.

Sumner County: Phillips 1 Ellie, NE NE SW 27-33-3w, dry, T.D. 4,730 ft., Mississippi lime 4,084 ft., Arbuckle 4,701 ft.

MISSOURI-NEBRASKA

ST. Joseph, Mo.—The Ohio Oil Co. is moving materials to Nemaha County, Kansas, 1½ miles west of Sabetha, where it proposes to drill 1 Lamporter, a wildcat, in C NE SW 3-2s-14e. Edwin S. Towle et al 1 Elizabeth M. Dillaplain, a wildcat drilled 7 miles south of Fairview in C SW NE 5-4s-15e, was a dry hole. The Hunton lime was topped at 2,995 ft. and the hole went to 3,045 ft. This was the operators' third test in the area.

(Continued on page 132)

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Cheyenne, Wyoming. Notice is hereby given that the land herein described within the known geologic structure of the East Lance Creek oil and gas field, Wyoming, is offered to the qualified bidder of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act as amended by the act of August 21, 1935 (49 Stat. 674, 30 U.S.C. 226), at a sale to be held in the District Land Office at Cheyenne, Wyoming, at 10 a.m. on November 4, 1943, as a single parcel: T. 36 n., R. 64 W., sec. 28, S½NW¼. The lease will be made subject to the unit plan for the East Lance Creek Unit Area, Wyoming, approved March 2, 1938. The successful bidder must deposit on date of sale with the officer in charge of the sale a certified check or cash for one-fifth of the amount bid by him and file a showing of qualifications to receive a lease as required by section 7 of Circular 1386. The remainder of the bonus bid and annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Bids may also be submitted by mail provided they are accompanied by one-fifth of the bonus bid and a showing of qualifications of the bidder. The envelope must be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. William G. Johnson, Register.

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Among the Drilling Contractors

Hollow Drilling Co., organized in 1937 at Wichita, Kans., and Bridgeport Oil Co., also of Wichita, have merged, and the new company will be known as Bridgeport Oil Co., Inc. Frank H. Hollow, president of Hollow Drilling Co., subsidiary of the Bridgeport company, will head the new concern.

George & Wrather, Mount Carmel, Ill., have contract for Clack C. Nye 1 Henry L. Hahn, SW SE SW 18-7s-11w, Vandenburgh County, Indiana. Contract depth is 2,600 ft.

R. M. Perry has drilling contract on Socony-Vacuum Oil Co., Inc., 1 Ethel Schultze, in SE SE SE 23-1s-16w, Van Buren County, Michigan.

Delta Drilling Co. and H. H. Torrance, of Tyler, Tex., will begin a second important Trinity series wildcat test for the Grand Saline area, Van Zandt County, Texas. This new operation is going to 8,850 ft. to explore the Travis Peak. The site is on a 25-acre tract in the northwest corner of the J. Walker Survey. It will be carried as the Delta et al 1 D. G. Gipson.

Maloney Drilling Co. has staked a location for its 1 W. H. C. Goode, in the H.E.&W.T. Survey, southeastern Upton County, Texas. Contracted to 4,000 ft. and scheduled to start before October 15, the wildcat is northeast of the McCamey pool and 11 miles southwest of the Plymouth Oil Co. 1 Alford, abandoned at 10,364 ft.

L. E. Gray, Princeton, Ind., has contract for R. D. Brown, Inc., 2 Myrtle M. Hall, NE NE NE 20-1s-11w, Gibson County, Indiana. Contract depth is 2,250 ft.

A. E. Elliott, Mount Carmel, Ill., will drill an 1,850-ft. well for Kirk D. Holland at the 2 Edwin and Bessie Phillips, in Donation 115-1n-10w, Gibson County, Indiana.

Big Chief Drilling Co. has been awarded contract for the Great Lakes Carbon Co. 1 Jerome, in C SW SW 16-20n-2w, east of the Lucien pool, Noble County, Oklahoma. Surface pipe was set at 255 ft.

G. C. English, of Cement, Okla., has the contract on Ace Gutowsky 1 State School Land, in SE SE SE 32-4n-8w, near Acme, in southwestern Grady County, Oklahoma. Location is on a 6,000-acre block assembled earlier in the year. Contract is for 5,000 ft.

Jack W. Frazier, contractor and operator of Houston, Tex., is moving one of his rigs to 1 Gerhard Zoch, a new wildcat in the Winchester area of Fayette County, Texas. Location is 466 ft. from the south line and 500 ft. from the northwest line of the survey and a 200-acre lease, in James S. Lester Survey, 3½ miles northeast of Winchester townsite.

Kingery Drilling Co. has the contract on the G. M. Connally 1 Hayes, in SE SE NE 22-4n-11w, Comanche County, Oklahoma. The contract is for 1,700 ft. While drilling at 840 ft. the well blew out to show both gas

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and oil, but was shut in and brought under control before estimates were made on the value of the show. It was to drill deeper before testing.

Northern Development Co., Calgary, Canada, has contract for Commonwealth Drilling Co. 1 Red Star, LSD 12, 11-50-1w4, north of Lloydminister, eastern Alberta, Canada. Location is about 3 miles southwest of a producing well which had initial output of 40 bbl. daily from 2,005 ft.

John Mabee, Tulsa, has contract to drill two wells for Texas Co. in the new field opened in southeastern Andrews County, West Texas. Mabee is also the owner of the land on which the discovery well and the two new tests will be drilled, holding 110 sections of the fee land in the area. Another wildcat is being drilled on the north end of his ranch by Mid-Continent Petroleum Corp.

Grey Wolf Drilling Co., Houston, Tex., has moved rig from Adams Oil & Gas Co. 1 H. Wuensch, dry hole in the James Foster Survey, northeast side of the Yorktown field in De Witt County, Texas, to the same operator's new wildcat about 2½ miles southwest of the Yorktown field discovery and about 1 mile southeast of Yorktown townsite. The new test is Adams 1 Edward Danysh, southwest part of 107.7-acre tract in the J. McDermott Survey, A-343. It is a 9,500-ft. Wilcox test.

Two States Drilling Co. will drill two tests in Michigan, these being the Ohio Oil Co. 4 O. E. Boettcher, in C S½ NE NE 33-18n-9w, Osceola County, and the Ohio Oil Co. 2 William Howe, in S½ NE SW 31-19n-9w, Osceola County.

Richmond Drilling Co., Midland, Tex., has contract to drill a 4,500-ft. test for John I. Moore on the Barnsley ranch in southern Crane County, West Texas. Location is in NE NE Section 42, Block 32, Public School Land, 2 miles south of production in the Sand Hills pool.

Henshaw Brothers of San Antonio, Tex., are preparing to move one of their rigs to their 1 Bevly, a new 7,000-ft. wildcat test about 3 miles southeast of the Clarkwood townsite, Nueces County, Texas, providing they are unable to find another contractor with rig near the location.

Rowan Drilling Co., of Houston and Fort Worth, Tex., is completing two wells for Tide Water Associated Oil Co. in the Venice field of Plaquemines Parish, Louisiana. The 23 Buras Levee district, 23-21s-30e, was drilled to 10,105 ft., and the 24 Buras Levee district, 34-21s-30e, was drilled to 11,253 ft. in shale.

J. W. Lang, Inc., has contract to drill Michigan Petroleum Co. and J. W. Lang, Inc., 1 Maatman, in NE NE SE 11-4n-15w, Allegan County, Michigan.

Ashby Drilling Co. has been awarded contract to drill Sohio Producing Co. A-1 State-Moffatt, in C SE SE 29-20n-3e, Arenac County, Michigan.

Perry-Rusk & Ormiston will drill W. H. Clock 1 Hugh MacVean, in SE SW SW 9-2n-11w, Allegan County, Michigan.

Goll, Graves & Mechling, Inc., has drilling contract on Basin Oil Co. 1 Harold L. Calkins, in S½ SE NW 35-18n-1e, Gladwin County, Michigan.

Lupher Drilling Co. has drilling contracts for four tests in Michigan. These are the Oil Producers, Inc., 1 Katherine S. Rice, in C N½ NW NW 25-18n-12w, Lake County; the Rex Oil & Gas Co. A-1 State-Goodwell, in C E½ NW NW 8-14n-11w, Newaygo County; the Pure Oil Co. 3 Detroit Trust Co., in C E½ NE NE 17-14n-11w, Newaygo County, and Pure Oil Co. 1 Lloyd Stoner, in C E½ NE SW 8-14n-11w, Newaygo County.

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WILDCATS AND DISCOVERIES

WILDCAT completions reported last week show a small decline from the record of the preceding week. Discoveries were of little interest, most being extensions to producing areas.

Probably the most interesting was the discovery well in the Chitwood pool, Pratt County, Kansas, Lion Oil & Refining Co.'s wildcat flowed from Simpson sand and lies on a well-defined trend extending into the Fort Dodge basin. On this trend are the Cairo gas field, 3½ miles to the northeast and farther to the northeast are Cunningham and Lerado. Along the same trend and 30 miles to the southwest is the newly discovered Bear Creek pool in Barber County.

In Illinois, extensions were proved to the Albion, East Albion and Mount Carmel pools in the Wabash River area. A fourth producing spot was opened up near Epworth in White County, but as the discovery made only 7 bbl. of oil and 30 bbl. of water from the McClosky, it probably will not be of commercial importance.

Both of Oklahoma's gas discoveries will probably prove to be extensions when intervening areas are drilled up. One is in the newly-discovered Elgin area in Comanche County and the other is northwest of the Cruce pool in Stephens County. Both produce from shallow Pennsylvanian sands. In North Texas, the Hildreth pool of Montague County has been extended and in the Eliasville pool of Stephens County, an outpost found production in the Mississippi lime, a new pay for the pool. West Texas' discovery was a small pumper in Pecos County, making 10 bbl. in a shallow sand.

WILDCAT COMPLETIONS

	Week ended October 16, 1943					Cumulative total for 1943				
	Oil	Distillate	Gas	Dry	Total	Oil	Distillate	Gas	Dry	Total
Ohio	0	0	0	5	5	4	0	20	42	66
Indiana	0	0	0	0	0	3	0	0	48	51
Kentucky	0	0	0	3	3	18	0	2	101	121
Illinois	4	0	0	8	12	58	0	3	330	391
Michigan	0	0	0	6	6	9	0	1	124	134
Kansas	1	0	0	13	14	51	0	1	290	342
Nebraska-Missouri-Iowa	0	0	0	1	1	0	0	0	20	21
Oklahoma	0	0	2	2	4	37	1	16	215	269
Texas:										
North Central	2	0	0	7	9	46	0	1	284	331
West	1	0	0	1	2	10	0	1	65	76
Panhandle	0	0	0	0	0	0	0	0	5	5
East	0	0	0	0	0	5	0	2	83	90
Gulf Coast	0	0	0	3	3	4	7	6	90	107
Southwest	0	0	0	3	3	21	11	3	222	257
Total	3	0	0	14	17	86	18	13	749	866
Louisiana:										
North	0	0	0	2	2	4	0	3	58	65
Gulf Coast	0	0	0	2	2	12	6	1	26	45
Total	0	0	0	4	4	16	0	4	84	110
Arkansas	0	0	0	2	2	2	0	0	54	56
Mississippi and Southeast	0	0	0	1	1	3	0	0	49	51
Montana	0	0	0	3	3	4	0	1	20	25
Wyoming	0	0	0	0	0	6	0	0	15	21
Colorado, Utah	0	0	0	1	1	0	0	1	4	5
New Mexico	0	0	0	2	2	5	0	2	22	29
California	0	0	0	2	2	5	0	9	115	129
Total United States	8	0	2	66	76	307	25	73	2,282	2,687
Total previous week	10	0	5	68	83					

OKLAHOMA

Bartlesville Sand Is Second Pay at West Edmond

THE West Edmond pool of Oklahoma County, the state's most promising new field, had a second pay added in Bartlesville sand last week. Sohio Producing Co., completing two new producers on the north side of the field, had pay in the sand at its 1 Cargill, SE SE 30-14n-4w, after drilling out the plug at 6,718-65 ft. The well started flowing at the rate of 15 bbl. an hour, by heads, and operators were preparing to make swabbing tests. Electric log showed saturation in this sand in some of the other wells.

The same company's 1 Harper, SE NE 31-14n-4w, was nearing completion, the sixth for the field, after flowing 75 bbl. of oil the first hour through ¼-in. choke on tubing. Perforations were in the Hunton at 6,900-45 ft. It was choked to 300 bbl. a day after making over 1,100 bbl. in 24 hours through various-sized chokes.

Proven area of the field now takes in some 500 acres, with four wells finished, Sohio's two nearing completion, seven drilling wells and five getting under way. The first eastern outpost test was staked in NW NW 33-14n-4w. The well is D. D. Bourland's 1 Young. Operations are to start immediately. In Canadian County, 2½ miles northwest of the field, Ace Gutowsky's 1 Watson, SE SE SW 23-14n-5w, was bottomed at 7,400 ft., and had expected to perforate by the end of last week.

OKLAHOMA WILDCAT COMPLETIONS

Comanche County, Elgin area: John B. Hawley 1-E Stephens, SE NE SE 20-3n-10w, 3,000,000 cu. ft. gas, sand 805-76 ft., T.D. 1,150 ft.

Garvin County: Ohio Oil 1 Taylor, SE NW SW 26-4n-1w, dry, T.D. 4,342 ft., Viola 4,327 ft.

Love County: Mid-Continent Pet. 1 Nelson, SE NE SE 34-6s-2e, dry, T.D. 6,000 ft., Hunton 1,820 ft., Bromide 3,085 ft., McLish lime 4,640 ft.

Stephens County: T. H. McCasland 1 Eggleston, NW NW NE 30-1n-5w, spray of oil and 11,000,000 cu. ft. gas, Pennsylvanian sand 1,691-1,714 ft., T.D. 1,718 ft., S.I.P. 550 lb.

Missouri

(Continued from page 129)

Moneba Development Co. announced it was rigging up tools to deepen Skelly Oil Co. 1 Roesch, discovery well in the Barada pool of Richardson County, Nebraska, in C N½ NW 36-3n-16e. This well was drilled in October 1941 and topped Hunton lime at 2,432 ft. Pipe was shot at 2,437-88 ft., to start production. Moneba says it will go to Viola lime and on to Wilcox and Arbuckle if necessary.

Power Oil Co. 2 Bohrer in the Ogle pool of Richardson County, Nebraska, E½ SE NW 10-1n-14e, drilled 20 ft. into Hunton lime and was preparing to acidize.

PERSONALS

CHARLES V. MILLIKAN

Amerada Engineer Becomes Sixth Lucas Medalist

CHARLES V. MILLIKAN, chief petroleum engineer of the Amerada Petroleum Corp., Tulsa, this week was awarded the 1944 Anthony F. Lucas Gold Medal, "for his outstanding contributions to engineering in the development and production of petroleum." The award was made by directors of the American Institute of Mining and Metallurgical Engineers meeting at Chicago, October 18.

Mr. Millikan is the sixth recipient of the Anthony F. Lucas Award, the first having been made to J. Edgar Pew, vice president of the Sun Oil Co., Philadelphia, Pa., in 1937. The medal was established in 1936. Income of the fund in excess of that required for such medals as may be awarded from time to time may be used for scholarships or other purposes to promote the welfare of the Petroleum Division of the Institute.

In addition to Mr. Pew, the following is a list of the recipients of the Anthony F. Lucas Gold Medal: 1938, Henry Latham Doherty (deceased), former head of the Cities Service Corp.; 1940, Everette DeGolyer, assistant deputy petroleum administrator, Washington, D. C.; 1941, Conrad (posthumously), and Marcel Schlumberger; 1943, John R. Suman, vice president, Humble Oil & Refining Co., Houston, Tex.

The present 1944 award will be presented to Mr. Millikan at the annual meeting of the Institute to be held in New York City in February 1944.

Mr. Millikan was born at Morrison, Okla., on February 19, 1896. He was educated at the Oklahoma A. & M. College, and the University of Pittsburgh. He entered the Mid-Continent oil fields in 1917, immediately after he was graduated from the A. & M. College, and then joined the Navy during the first World War. On returning after the war he entered the University of Pittsburgh and after graduation in 1920 he gathered experience in field geology in the Appalachian oil fields until 1922 when he returned to Oklahoma. There he joined the Amerada Petroleum Corp., the organization with which he is now associated.

In presenting the name of Mr. Millikan to the board of the Institute, William B. Heroy, chairman of the Anthony F. Lucas Gold Medal Committee, offered the following citation:

"For his outstanding contributions to engineering in the development and production of petroleum. For his studies of reservoir behavior and his many published papers advancing the art of reservoir control. For his work in appreciating the need for an instrument capable of determining reservoir pressures, in developing a gage for recording bottom-hole pressures, and in teaching its use. For his long and effective service to the Institute in the Petroleum Division."

W. C. Rountree and **Lawrence Smith,** gang foremen in Texas Pipe Line Co.'s North Texas division, have been transferred to War Emergency Pipelines, Inc., as pipe-line inspectors. **C. W. Wise,** chief clerk in the pipeline company's Illinois division, is now supervisor of pump-station construction for WEP.

James E. Clark, geologist for Ohio Oil Co. in the Falls City, Neb., field for the past 2 years, has been transferred to the Wichita, Kans., office.

Frank F. Axtell, engineer in the refining department of Texas Co.'s Port Arthur (Tex) Works, has been made boiler-house foreman for Neches Butane Products Co., Port Neches, Tex. Other transfers from the refining department of the Port Arthur Works to Neches Butane Products Co. include: **Vernon M. Berry,** controlman, now operator; **O. E. Droddy,** gangpusher, now inspector; **J. R. Fleming,** chemical engineer, similar position with Neches; **H. D. Pendarvis,** stillman, now operator; **G. F. Russell,** stillman helper, now instrument man No. 1; **Charles W. Maloney,** construction engineer in the export sales department, West Indies, is now assistant supervising engineer in charge of oil-handling facilities for the U. S. Navy at Balboa, Canal Zone. **O. G. Sanders,** electrician in the refining department of Texas Co.'s Port Neches Works, has been made instrument man No. 1 for Neches Butane Products Co.

Frank Louy, Jr., petroleum engineer for Ohio Oil Co. at Edmond, Okla., spent several weeks at Cement, Okla., overseeing the installation of a salt-water disposal system for the company there.

Henry J. Wilkens, Edward P. Wells, Jr., and **William C. Bryant** are new chemical engineers for Ashland Oil & Refining Co., Ashland, Ky. **Glyde W. Royse** and **John C. Allen** have joined Ashland as supervising operators.

Abdul Khaliq Mehta, a native of India, has been assigned to a geophysical crew operating in the vicinity of Hoxie, Kans. He was born at Qadian, Punjab, India. He was selected by the government of the Punjab to receive technical education in the United States. He studied a year at Colorado School of Mines and from 1940 to 1942 studied at the University of Texas and at Texas Technological College, receiving a degree in geology. He plans to return to India as soon as conditions permit.

Jarrett S. Smith, district gas superintendent for Humble Oil & Refining Co., has been transferred from Pledger, Tex., to Lariette, La.

E. M. Bedford has been appointed district chief clerk for Humble Oil & Refining Co. at South Clara, Miss., from Avery Island, La.

Harry Nelson has been appointed acting manager of the oil pipe line and storage divisions of Cities Service Oil Co., Bartlesville, Okla., a promotion from his previous position of

general superintendent of oil pipeline operations.

Ben J. Groner, district chief clerk for Humble Oil & Refining Co., has been transferred from Magnet to Livingston, Tex.

R. A. Gregory of Forest Reserve, Trinidad, has returned to Petrolia, Ont., after completing a 4-year drilling contract. He will return to Trinidad with Mrs. Gregory and children in November.

B. L. Thorne, mining engineer of Calgary, Canada, was reelected president of the Alberta Petroleum Association at its annual meeting recently.

H. A. Ireland, of the U. S. Geological Survey, has opened office with Oklahoma Geological Survey at Norman, Okla., and is making contacts for preliminary work in a survey of potential deeper oil reserves in Oklahoma.

John T. Hayward, petroleum engineer, on leave of absence as vice president and general manager of Barnsdall Research Corp., has been commissioned a lieutenant commander in the United States naval reserves and transferred from the Washington naval yard to the Navy mine warfare test station at Solomons, Md. Mr. Hayward has been doing research work in connection with detection of submarines and the use of depth bombs since he entered the service in September 1942.

Harvin L. Landua, formerly stationed at Wichita Falls, has been transferred to Wasson, Tex., and appointed district petroleum engineer there for Humble Oil & Refining Co.

Frederick G. Clapp, Bronxville, N. Y., consulting geologist, has gone to Ankara to become petroleum advisor to the Turkish Government. Mr. Clapp was petroleum adviser to the Imperial Government of Iran in 1927-28 and again in 1933. He has done extensive geological exploration in China, Australia, New Zealand, Iran, Afghanistan and the Dominican Republic. He also is the author of numerous technical papers on petroleum geology in many parts of the world and has some travel books to his credit. In the last 5 years he has engaged actively in oil operations in Oklahoma.

C. E. Beecher, formerly chief petroleum engineer for Cities Service Oil Co., Bartlesville, Okla., has been promoted to general superintendent of the oil production division. He has served the company since 1924, first in special research work and later as an engineer.

Jackson M. Barton, geologist with Magnolia Petroleum Co., formerly stationed at Imperial, Tex., has been transferred to the main West Texas office at Midland.

Robert L. Westbrook, deputy supervisor in charge of the Midland office of the Texas Railroad Commission, has resigned his position with the state organization to accept a position as production engineer with Gulf Oil Corp. **John B. Matthews** has been named temporary acting supervisor to succeed Mr. Westbrook.

William E. Carbaugh, of Seneca, Pa., has been retired by National Transit Co., Oil City, Pa., after 20 years of service. Employes of the production department presented him with a gift.

M. Parke Huntington has been promoted from field superintendent to district superintendent for Stanolind Oil & Gas Co., at Midwest, Wyo. He has been succeeded in the former position by **Robert N. Hastings.**

Shifts: **Carl W. Blakey,** engineer, Seismograph Service Corp., Fort

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Stockton, to Big Lake, Tex.; **S. G. Burt**, superintendent, Schneider & Gwin Drilling Co., Carmi, Ill., to Broken Arrow, Okla.; **W. H. Tillock**, superintendent, Cities Service Oil Co., Burrton, Kan., to Seminole, Okla.; **Leo. W. Konz**, engineer, Carter Oil Co., Torrington, to Douglas, Wyo.; **M. L. Hall, Jr.**, engineer, Phillips Petroleum Co., Bartlesville, Okla., to Edinboro, Pa.

Herbert R. Hansen, Houston, Tex., has resumed his civilian post as purchasing agent for Superior Oil Co., after serving several months at Washington as assistant director of the materials division, Petroleum Administration for War.

J. Howard Hooper, for the past 2½ years in the land department of the Phillips Petroleum Co., Bartlesville, Okla., at Midland, Tex., has been transferred to the company's district land office at Shreveport, La.

H. W. WHEELDON

Harry Wheeldon has resigned as superintendent of the natural-gasoline department of the Lone Star Gas Co., Dallas, Tex., to become vice president of the Shamrock Oil & Gas Co. with headquarters in Amarillo, Tex. With the Shamrock organization he takes the place of the late Paul C. Coffin. Mr. Wheeldon served the Lone Star company in various capacities, starting in 1922.

Charles H. Pishny has resigned as a member of the engineering staff of the Amerada Petroleum Corp., Tulsa, and is now associated with Cummins & Berger, consulting geologists of Fort Worth, Tex. The firm name has been changed to Cummins, Berger & Pishny. Previous to joining the Amerada organization several years ago, Mr. Pishny was connected with the Marland Oil Co. and the Carter Oil Co.

Lester L. Morris, secretary of the Bridgeport Oil Co., Wichita, Kans., addressed the October meeting of the Petroleum Accountants Society of Kansas, Wichita chapter, this week on "Current Wage and Employment Problems."

Ralph W. Gallagher, president, and **Eugene Holman**, vice president, of the Standard Oil Co. (New Jersey), left last week on a 4-week trip to South America.

P. W. Pitzer, R. A. Pitzer, and **P. W. Pitzer, Jr.**, oil men of Breckenridge, Tex., have purchased the Blach ranch, embracing nearly 10,000 acres, for a cash consideration of $219,600. The Blach ranch was founded in 1883 by Max Blach, of Birmingham, Ala. The ranch is in Shackelford County, Texas.

Merrill E. Shoup, Colorado Springs, Colo., was elected a director of Holly Oil Co., of Colorado Springs, at the stockholders' annual meeting. Four directors reelected were **Wiley Blair, Jr.**; **Ethel F. Carlton**; **C. A. Johnson**, and **G. W. Repetti**. Operating offices are at Long Beach, Calif.

Lt. Robert A. Newman, employed at the Baytown, Tex., works of Humble Oil & Refining Co. before he entered war service, has been cited for shooting down a German plane while escorting Flying Fortresses through the heavily defended European coastal zone.

Jeff Hawks, scout for Sinclair-Wyoming Oil Co., at Evansville, Ind., has been transferred to Casper, Wyo., and **Keith White**, of Hammond, Ind., has been named to succeed him.

J. W. Burrage, field supervisor of the Lone Star Gas Co. production department, has resigned to affiliate with Morrison Producing Co. at El Dorado, Kans., where he will be engaged in operating a secondary-recovery project. He had been with Lone Star since 1928.

Greetings

MEN of the OIL INDUSTRY

1st NATIONAL

This oil-minded bank extends Greetings and Best Wishes to the 14th Annual Meeting of the Independent Petroleum Association of America. » » » Many members of this Association have banked with us for years and we are appreciative of the fact that their business has helped us to grow to be the Southwest's Largest Bank.

FIRST NATIONAL BANK IN DALLAS

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Market Developments

East Coast

NEW YORK.—Improvement in the supply situation on the East Coast is continuing through October. The A.P.I. index of available supplies rose to 46.3, an increase of 1.9. This increase lifted total available supplies to 81 per cent of the level prevailing a year ago and raised them to the highest point since late December of 1942.

During the past week the OPA authorized reinstatement of the 0.75-cent allowance which tank-wagon sellers of gasoline must make to certain bulk consumers in five central Atlantic states and the District of Columbia. This allowance was discontinued 6 weeks pending the outcome of a protest on the part of suppliers.

Texas Co. submitted a bid of $3,750,000 to the City of New York for the right to sell gasoline and other oil products at the huge Idlewild airport now building in the city. The bid was based on a 10-year contract and provided that the city would receive 0.5 cent per gallon on all gasoline sold. The Texas Co. bid carried a condition that three other companies, Socony-Vacuum Oil Co., Inc., Shell Oil Co., Inc., and Colonial Beacon Oil Co., the last a subsidiary of Standard Oil Co. of New Jersey, be permitted to participate on a pro rata basis.

Gulf Coast

HOUSTON, Tex.—Acute shortages of civilian motor fuel continued this week on the Gulf Coast. Refiners were drawing down inventories of motor fuel to accommodate current commitments and could see no particular relief in sight.

Some improvement was noted during the week in the calls for residual fuel oil. However, the heaviest demand for movement of citrus crops out of the Rio Grande Valley will not develop until next month.

A few refiners are pinched by the accumulation of heavy fuel-oil stocks but a majority are working off sufficient supplies to permit normal operations.

Crude-oil supplies are growing more troublesome at certain refineries. The problem is more specifically related to types of crude than to over-all volume, according to most plant operators.

Natural gasoline is tight, particularly in the Corpus Christi area which is largely dependent on the volume manufactured in that vicinity. North Texas, East Texas and Louisiana manufacturers ship chiefly to the Houston, Port Arthur, Beaumont district because of more favorable freight rates. Part of the current shortage is attributed to closer fractionation and diversion of certain cuts from the natural-gasoline stream to specialized war products.

Prices on all products were steady at unchanged levels, it was reported this week.

Mid-Continent

OUTPUT of refineries in the Mid-Continent territory has fallen so far below demand that operators are beginning to express concern over the problem of keeping their allotment of tank cars employed and thus avoid having to surrender them. Some refiners are trying to buy almost any product except heavy residual fuel from plants in other districts, usually to find that the owners of such plants are having their own tank-car troubles. Lack of adequate crude supplies is preventing many refineries from operating at capacity.

Railroads and industrial plants until recently have been taking enough heavy fuel oil to keep Mid-Continent inventories from becoming burdensome, but now stocks of this material are beginning to back up. In the North Texas and Panhandle regions the situation was reported this week to be causing anxiety. It even was said that a few plants might have to shut down temporarily because of their inability to get rid of their heavy fuels. Such a step, it was pointed out, would cut the production of gasoline still further, thus aggravating already serious conditions.

Sales managers generally were trying to steer clear of prospective buyers of anything other than heavy fuels. They were hard pressed to fill orders already on their books.

Refiners reported growing difficulty in filling their natural-gasoline requirements. No change was reported in Oklahoma prices of natural gasoline, but North Texas quotations were an eighth-cent higher.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)
Week Ended October 9, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	132	2,220	413	868
Ind., Ill., Ky.	717	13,573	3,189	6,109
Okla., Kan., Mo.	334	6,115	1,532	2,379
Censored area*	2,093	30,945	10,878	19,620
Rockies	100	1,165	728	451
California	718	15,690	41,847	11,877
Total 10- 9-43	4,094	69,708	66,585	41,304
Total 10- 2-43	4,159	70,128	66,407	40,898
Total 10-10-42	3,765	77,406	78,838	46,161

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate

Week ended:	Bbl. of crude*
October 9, 1943	233,471,000
October 2, 1943	234,643,000
October 10, 1942	239,165,000

*Excludes unrefinable California stocks.

PAW Takes Control Over Butylenes and Isobutane

WASHINGTON, D. C. — Control over separation and disposition of butylenes and isobutane has been imposed by the Petroleum Administration for War in Directive 75, issued October 19, requiring that these products be used only in the manufacture of aviation gasoline, synthetic rubber or their components.

All refiners and natural-gasoline manufacturers must report to PAW by November 1, on Form 34, the quantities and composition of hydrocarbon mixtures containing butylenes, isobutane or normal butane, and facilities available for recovery and shipment.

PAW said the need for these products in aviation gasoline and synthetic rubber is increasing and all supplies available from the petroleum industry must be so used.

The directive does not apply to mixtures containing less than 5 per cent of isobutane, butylenes and normal butane, nor unless 20 per cent of these three is isobutane and butylenes.

Plants producing less than 10,000 gal. per day of total liquid products are exempt and special exceptions will be made for plants already producing other important petroleum war products or lacking extraction equipment, or on showing of unnecessary hardships.

The new directive came as no surprise to natural-gasoline manufacturers, who said their operations were being devoted almost wholly to the war effort anyway. "About 95 per cent of our butylenes and isobutanes are under government regulation now," said an official of one large natural-gasoline company, "inasmuch as that much of our output is moving into the aviation program. I would say that Directive 75 will not affect more than 5 per cent of production."

Refinery Prices

(Prices as of October 19, 1943)

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	70-72	68-70	63-66
Mid-Continent*	.....	.....	6.000	.....	5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	6.750-7.500	6.250-6.500	6.125-6.250	5.750-6.125	5.125-5.500

*Basis Group 3. †1939 C.F.R. (research method). §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C†
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.85-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †Gravity range. ‡Pacific Specification 200.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625	3.500	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	§1.10-1.15
Gulf Coast	3.750-3.875	.....	1.35	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	4.750	5.700
North Texas	4.375	5.250
North Louisiana	4.375	5.250
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D. 10-25	27.00
150-160 D, 0-10	23.00
120-125 D, 0-10	23.00
Steam refined:	
900 dark green (untreated)	9.00

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)

10 pour point	30.50
15 pour point	29.50
25 pour point	28.00
Steam refined:	
900	16.00
650	16.50
600 flash	17.50
430 flash	17.50

Neutral Oils

Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
300-3	15.00
300-3	18.00
900-3	19.50
600-3	20.00

Note: Viscous neutrals, 19-25 pour, quoted 0.5 cent under 0-10 oils.

CALIFORNIA—

200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00

Neutral Oils

Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00
200 vis. at 70° F., 3 color:	
Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt.	16.90	5.50	10.20
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.20
Hartford, Conn.	15.60	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.95
Pittsburgh, Pa.	16.70	5.50	12.20
Portland, Me.	16.30	5.50	10.20
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.20
Average 14 cities	16.02	5.14	10.80

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Chicago, Ill.	14.10	4.50	10.60
Cleveland	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	10.10
Detroit, Mich.	14.40	4.50	10.00
Fargo, N. D.	16.90	5.50	11.60
Huron, S. D.	16.30	5.50	11.00
Indianapolis, Ind.	15.60	5.50	10.10
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.80
Minneapolis, Minn.	15.90	5.50	10.60
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	13.30	4.50	8.70
Average 14 cities	17.46	5.57	9.84

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero tank wag
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	...
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	10.00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10.50

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

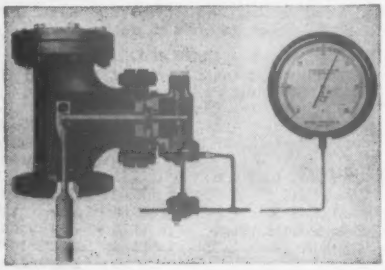
(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.59	5.96	10.93

Equipment Progress

Liquid Level Gage Operates On "Null" Balance Principle

A new liquid level gage operating on the pneumatic "null" balance principle is announced by Moore Products



Co., H and Lycoming Streets, Philadelphia, Pa.

Equipment consists of a transmitter with Moore booster pilot valve, and a receiver which may be indicating, recording or controlling, for installation at a distant point. Transmitter may be furnished with floats over 60 ft. long, for installation on pressure tanks or on large tanks of spherical construction. Transmitters are also available mounted in float chambers, for the control of liquid level. It is especially well applied on hazardous or corrosive fluids, due to the packless construction and the ability to confine any leakage of hazardous fluids inside the safety pressure housing containing the balance mechanism. Construction is suitable for working pressures as high as 300 lb. per sq. in.

The transmitter operates on the principle of force change due to buoyancy of the liquid rather than a float following a changing level. A stainless steel disk carrying the float arm is mounted on the outlet of the tee. The tubular float is suspended from one end of the float arm and the balance bellows is connected to the other end. A small change of buoyant force on the float is balanced immediately by a change of air pressure in the bellows. This is the pressure transmitted to the receiving meter. Due to the pneumatic "null" balance principle employed, all members are maintained in equilibrium. The change in the balance position on the bellows between zero and full scale is less than 0.001 in., thereby eliminating all nozzle and bellows nonlinear characteristics, as well as metal fatigue resulting from motion. This guarantees an accurate transmitted pressure, which is always linear with the change of level. Suitable stops are provided to keep any motion of the disk well within its elastic limit. Thrust pivots are provided for overload pressures. Stainless steel packless disk will distort but not rupture on pressures up to 5,000 lb.

Transmitters for use on subzero temperatures have balancing mechanism removed from the frosting zone and are compensated for ambient temperature changes.

Compressor Calculator Offered by Cooper-Bessemer

An ingenious compressor calculator, designed to save critical time in computing compressor requirements or in estimating the performance of present compressor units, has been prepared by Cooper-Bessemer Corp., Mount Vernon, Ohio, and Grove City, Pa.

The calculator, which is made of heavy stock, is pocket size, measuring only 3½ in. by 8½ in.

Of slide-rule design, it can be used for quickly estimating the volumetric efficiency, brake horsepower and total piston displacement of any make of compressor, although it was originally intended for use primarily with Cooper-Bessemer's Type G-MV engine-driven compressor units.

Trade Literature

Atlas Lumnite Cement Co., 135 East Forty-second Street, New York, N.Y. Charts to simplify the solution of heat-transfer problems in connection with refractories and high-temperature insulation are contained in this 16-page booket. Curves on the 10 full-page charts are platted in terms of conductivity factors.

Young Radiator Co., Racine, Wis.— Catalog 103, summarizing the types of services and products the company offers. The firm specializes in heat-transfer equipment for every application.

BROWN INSTRUMENT CO. WORKERS ARE HONORED

Capt. Roy W. Bruner, United States Navy; Joseph Abbott, president of Local 116, U.E.R. and M.W. of A.; Lt. Col. Robert Allen, United States Army, and E. B. Evleth, vice president and general manager of the Brown company

Workers and officials of Brown Instrument Co., division of Minneapolis-Honeywell Regulator Co., have been cited for "outstanding production of war material," and have received the Army-Navy "E" Award at the direction of Under-Secretary of the Navy James Forrestal. The program was highlighted by a radio broadcast of the event. Following introductory remarks by L. Morton Morley, vice president and general manager of the Brown company, Capt. Roy W. Bruner, United States Navy, presented the award, together with the "E" ensign. E. B. Evleth, vice president and general manager, and Joseph Abbott, president of Local 116, U.E.R. and M.W. of A., accepted the award. Richard P. Brown, chairman of the board, made the acceptance address. Presentation of the Army-Navy "E" lapel insignia was made by Lt. Col. Robert G. Allen, U. S. Army, and Harry N. Kuhns accepted the pins.

Among Equipment Men

Knebel Heads Division Of Southern Supply

Southern Supply, Inc., Wichita, Kans., announces the appointment of Jack A. Knebel as general manager of the Process Equipment Division, Tulsa. For the past 5 years Mr. Knebel has been general manager of the Resale Products Department of Joseph A. Coy Co. Prior to his connection with the Coy company, he was sales engineer with Eagle-Picher Sales Co., insulation division, located at Dallas, Tex.

The Process Equipment Division is a new department of equipment and engineering service offered by Southern Supply, Inc. As a member of the firm, Mr. Knebel will offer to Mid-Continent purchasers a complete line of process equipment, along with general supply lines. He will act in an engineering capacity to all departments of Southern Supply involving process and mechanical - equipment problems. The process equipment division will represent a number of nationally known petroleum-industry equipment manufacturers.

In 1942 Mr. Knebel was treasurer of the National Gasoline Supply Men's Association, and this year was elected vice president.

Headquarters of the Process Equipment Division of Southern Supply, Inc., is located at 315 East Fifth Street, Tulsa.

Norton Co. Appoints Sales Executives

Leroy K. Behr has been appointed district manager in Philadelphia for the abrasive division by Norton Co., Worcester, Mass., succeeding the late Allan Seymour. Mr. Behr has been with Norton Co. for 16 years, first in the sales engineering department at Worcester and then as abrasive engineer in England. For the last 3 years he has been abrasive engineer for eastern Massachusetts and Maine with headquarters in Boston. The district under the supervision of the Norton Philadelphia branch includes southeastern New York, New Jersey, eastern Pennsylvania, Delaware, eastern sections of Maryland and West Virginia, Virginia, North Carolina, South Carolina, and eastern Tennessee.

John C. Ewer, who has been abrasive engineer for western Massachusetts, Rhode Island, Vermont and New Hampshire takes over Mr. Behr's former territory and is in turn succeeded by C. Barnard Price, Jr., who has been field engineer for New England.

Dow Chemical Names Three Sales Executives

Dow Chemical Co. has appointed Clayton S. Shoemaker as eastern sales manager and Frederick A. Koch as assistant eastern sales manager. Mr. Shoemaker has been associated with Dow for a number of years and has occupied various sales executive positions with the company. Mr. Koch has been assistant manager of the New York sales office for 15 years.

C. S. SHOEMAKER

FRED A. KOCH

Announcements will be made in the near future on the opening dates of new offices in Boston and Philadelphia. It is expected that sales offices will be located in other important cities at a later date.

Mr. Shoemaker has announced the appointment of Alexander Leith, Jr., as manager of the Philadelphia office and Alfred A. Lawrence as manager of Dow's Boston office. Both Mr. Shoemaker and Mr. Koch, however, will make their headquarters at 30 Rockefeller Plaza, New York City. Ralph E. Dorland is manager of the New York office. He is a veteran of 26 years with Dow.

Cable Named Representative Of Lincoln Electric

H. E. CABLE

H. E. Cable, welding engineer of Lincoln Electric Co., Cleveland, Ohio, has been appointed representative in the Pittsburgh territory.

Mr. Cable, who will assist W. R. Persons, Pittsburgh district manager, is a graduate of Case School of Applied Science where he majored in mechanical engineering.

Prior to joining Lincoln Electric, Mr. Cable was general manager of Aluminate Chemicals, Ltd., of Toronto, a subsidiary of National Aluminate Corp., where, in less than 2 years, the concern erected its own manufacturing plant through his development of the business.

Mr. Cable is a member of the American Society of Mechanical Engineers, American Chemical Society, American Water Works Association, Master Boiler Makers Association, and is a professional engineer in Ohio

Athey Names Nadherny

R. J. NADHERNY

R. J. Nadherny has been made production manager of Athey Truss Wheel Co., Chicago, Ill., it was announced by C. K. Davis, Athey president.

"For some time it has been recognized that increased volume and changing conditions were imposing overloads on our organization which could not be entirely satisfied by individual transfers and redistribution of functions among existing personnel," says Mr. Davis in his announcement to dealers. "In meeting this situation, R. J. Nadherny has been added to our organization as production manager. This segregation of manufacturing from engineering and development amplifies our capacity in both divisions."

Mr. Nadherny has had 20 years of experience with equipment similar to the products manufactured by Athey, seven years of this time being spent in sales-engineering capacities with Mercury Manufacturing Co. of Chicago.

Pesco Product Co. Is New Firm Name

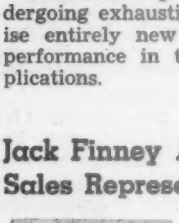
Effective October 1, the name of Pump Engineering Service Corp., 11610 Euclid Avenue, Cleveland 6, Ohio, was changed to Pesco Products Co. This change has no effect on present personnel or on the company's affiliation with Borg-Warner, the parent company.

President R. J. Minshall, in announcing the change, explained that "Pesco," which is used as the trade name for the aircraft pumps and accessories manufactured by this concern, is actually better known and more widely used within the industry than any other, longer name, and therefore it is only logical to incorporate Pesco into the firm name. Also, he added, the new name of Pesco

Products Co. is more descriptive of the activities of the organization in view of extensive preparations for postwar developments.

Various new products are now undergoing exhaustive tests, and promise entirely new high standards of performance in their respective applications.

Jack Finney Appointed Sales Representative



Jack H. Finney, Houston, Tex., has joined Pipe Line Service Corp. of Franklin Park, Ill., as sales representative in the Mid-Continent fields. In this capacity, he will serve the industry out of Houston, utilizing the company's complete pipe-coating and wrapping facilities at its plants at Longview and Corpus Christi, Tex.

Mr. Finney has had wide experience in the oil fields, having served as district manager in West Texas for Dowell Incorporated, of Tulsa, for the past 8 years.

University Engineering Head Joins Lincoln Electric

Lincoln Electric Co., Cleveland, Ohio, announces the appointment of William J. Conley, former chairman of the engineering department of the University of Rochester, as consulting engineer. He will act as welding consultant for various industries, handling problems on mechanical and structural design utilizing welding, as well as metallurgical problems involving welding processes.

In connection with his work, Mr. Conley will have charge of the company's welding educational activities, consisting of courses in welding engineering and design as well as lectures and talks on welding in the plant and in the field before technical societies and industrial groups.

Warren to Pennsylvania Salt's Philadelphia Territory

Edgar G. Warren, of Philadelphia, Pa., has been assigned by Pennsylvania Salt Manufacturing Co. to the heavy chemicals division to take over the Philadelphia territory. This territory was formerly covered by Lt. E. M. Wilson before he entered the military service. Mr. Warren was formerly with General Baking Co.

Tom Collins Rejoins Cummins Engine Co.

On leave of absence for the past year in performance of a special assignment for one of the country's largest motor freight lines, Tom Collins has rejoined the Cummins Engine Co., Columbus, Ind., manufacturers of Cummins diesels, in his former capacity of manager of the company's Pacific southern region. He will make his headquarters at the new regional offices which have been established at 411 West Fifth Street, Los Angeles, Calif.

Mr. Collins is a veteran member of the Cummins sales organization. He first became connected with the company, several years ago, as a sales representative of the Cummins dealer in Seattle. His work here later led to his appointment as manager of the central region, with offices in Cleveland, Ohio. From Cleveland he was transferred to the West Coast as manager of the Pacific southern region, with headquarters then located in Phoenix.

Younkin Heads Los Angeles Office of Brown Instrument

Gavin S. Younkin, who has been liaison engineer for Brown Instrument division of the Minneapolis-Honeywell Regulator Co. with its customers in the petroleum and chemical industry on the West Coast, has taken on additional duties as manager of the Los Angeles district office of the San Francisco branch, according to an announcement by L. Morton Morley, vice president and sales manager of Brown.

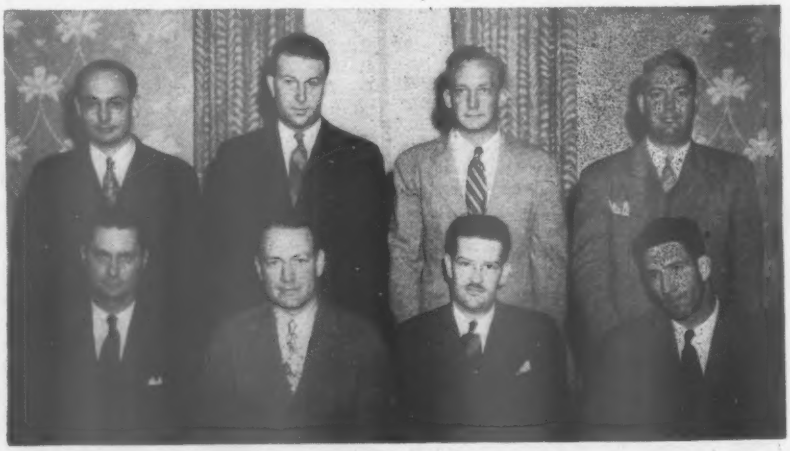
KOBE ORGANIZATION DISCUSSES POSTWAR PROGRAM

Field executives, company engineers and management personnel of Kobe, Inc., recently attended a meeting of all Mid-Continent division executives at division headquarters in Oklahoma City, Okla. The meeting was called for the purpose of reviewing technical and operating developments during the past year and laying groundwork for the company's postwar program.

Factual information from the field organization as it pertained to the use of the company's hydraulic pumping system and its importance to pumping operations in the war and postwar period, were chief topics of the meet.

Members attending the meeting were: H. K. Browning, general sales manager; S. M. Huffman, plant manager, and R. F. McArthur, chief engineer, from the company's home office at Huntington Park, Calif.

Others in attendance at the meeting were: V. T. Kirkhuff, chief sales clerk, division sales office; W. L. Smith, stores manager; E. O. Layman, field engineer; C. E. Edwards, field representative, Wichita Falls, Tex.; J. S. Williams, division office manager; R. A. Hammond, purchasing agent; R. A. Feemster, division sales manager; R. G. Ralph, division manager; H. K. Ihrig, manager technical service department, and the district managers pictured herewith.



District managers of Kobe, Inc., attending Mid-Continent meet at Oklahoma City. Back row: E. T. Harrison, Illinois; W. C. Gilmore, East Texas; G. F. Hurst, West Texas; C. E. Buchner, Gulf Coast. Front row: R. J. Lyons, North Texas; H. W. Wilson, Oklahoma; H. L. Walraven, Jr., Tulsa, and J. J. Prichard, Kansas district

Classified Advertising

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CONSTRUCTION Equipment For Sale Eighty-five per cent of new cost. Factory rebuilt.

1—TA-40 wide gage International Tractors equipped with Trackson Pipe-layers.
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1—Model D Buckeye Back-Filler.
1 TD-18 International Tractors wide gage equipped with Bucyrus Erie Hydraulic Angle Dozer.
1—Caterpillar 40—Gas.
1—Caterpillar 50—Gas.
1—D-6 Tractor.
1—D-8 Caterpillar equipped with Trackson Pipe-Layer.
1—D-7 New Styler Caterpillar equipped with Trackson Pipe-Layer.
1—R-4 Caterpillar equipped with Trackson combination Pipe-Layer and Angle Dozer.
1—Model 32 Buckeye Ditching Machine Wheel type equipped with 21-inch bucket now. Has extra set 14-inch buckets. Will cut up to 32½-inch width.
1—Model 12-A Buckeye Ditching Machine Wheel type equipped with 14-inch bucket. Has extra set of 10-inch buckets.
1—R-5 wide gage Caterpillar Tractor equipped with La Plante Choate Hydraulic Angle Dozer.
1—Chicago Pneumatic Air Compressor, 108 feet. 2 Stage.
1—500 gallons Standard Paint Pots.

All this equipment in first-class condition. Available at once. For information regarding the above described equipment, please refer to M. L. Beard or H. V. Bell. 504 First Nat'l. Bank Bldg., Hamilton, Ohio.

FOR SALE: In Kansas 1 #10 Adams Leaning Wheel Grader. Steel wheels and tractor hitch. $650.00. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: Refinery equipment. Hi-pressure steel valves and heavy 12" steel pipe, plain ends. List on request. HARVEY BROTHERS, Parkdale, Colo.

FOR SALE: 950—4½" OD 10V Thread new seamless steel casing couplings at $1.35 each. Patridge, Cities Service Oil Co., Bartlesville, Okla.

K-TYPE Star Drilling Machine, extra good International Power, truck and trailer mounted, complete with tools for 12" to 6" holes. Glen Seaborn, Osawatomie, Kansas.

PUMPING UNITS, Reda electric; one rated 3000 bbl. per day, 2700 foot lift; one 1000 bbl. 6000 foot lift; one 500 bbl. 5000 feet. Complete units in good condition; others smaller. Write your needs. P.O. Box 2094, Tulsa, Okla.

FOR SALE: At Oklahoma City, one each 4 x 6 and 5 x 6 Open Pattern Worthington Belt Driven Power Pumps. $150.00 each. Cities Service Oil Co., Patridge, Bartlesville, Okla.

LARGE Sullivan Core Drill. Also adaptable to comparatively deep slim hole drilling. Not on truck. Some accessories. Box B-814, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE

20,000 ft. 2½" Standard black, reconditioned pipe, T & C.

30,000 ft. 3" O.D. Genuine wrought iron tubes, plain and reconditioned.

7,000 ft. 6" cast iron flanged pipe, used.

1,500 tons re-usable structural steel.

500—6" Rolla grip couplings.

SONKEN-GALAMBA CORP.
Kansas City (16), Kansas

EQUIPMENT FOR SALE

WE offer at our Okmulgee, Okla., refinery the following:
9—Riveted Horizontal Steel Tanks, size 5'6" x 25' to 8' x 30'.
20—Small Vertical Riveted, suitable for production tanks.
5—4' x 20' Vertical Riveted Scrubber Tanks. Would make gun barrel or run-down tanks.
3—Small Scrubber Tanks, used in tail gas plant.
4—5' and 6' x 30' Vapor Towers.
4—Badger Towers.
5—10' x 30' Crude Stills.
1—12' x 32' Crude Still.
5—14' x 32' Crude Stills.
1—Green Fuel Economizer.
Patridge, Cities Service Oil Co., Bartlesville, Okla.

ELECTRIC POWERED ROTARY DRILLING RIG

Complete, in good operating condition; just off 7,460' Oklahoma well. 2—300-h.p. Sterling gas/butane engines with Marley cooling tower, driving 2 Westinghouse D.C. generators; EMSCO H46 draw works and 25½" roller bearing table, driven by 150/300 h.p. Westinghouse motor through Link Belt speed reducer; 7¼ x 18 Wilson Synder pump, driven by 200-h.p. Westinghouse motor. Exciter, cooling fans and motors, wiring, switchboard. With or without 7,000' 3½" OD drill pipe, excellent condition; 6,500' 4½" OD drill pipe, fair condition. At Seminole, Okla. PIONEER DRILLING COMPANY, 738 Kennedy Bldg., Tulsa, Okla.

FOR SALE: Near Arkansas City, Kans., 1—25 H.P. Ohio Single Cylinder Gas Engine. $150.00. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE—Complete slim hole rotary outfit, 85' Portable Derrick, three new Allis-Chalmers L-90 engines, 3,000' of 4½" drill pipe, and O.W.S. oil bath rotary table, all in A#1 condition. Located Oklahoma City, Okla. Thos. Whelan, 2612 First Natl. Bldg., Oklahoma City, Okla.

FOR SALE: Approximately 3000' of 3½" 30' Drill Pipe with A.P.I. Full Hole Tool Joints. Melton Machinery & Supply Co., Seminole, Oklahoma.

FOR SALE—MAPS

FOR SALE—MAPS

685 oil fields in South Texas and Louisiana now mapped and maintained daily; show all intimate details of ownership and development. 2 ft. square. $3.50 each. Also County and Base Maps.

ZINGERY MAP CO. Houston, Tex.

BUSINESS OPPORTUNITIES

CRUDE OIL WANTED

Competent and experienced refinery operators want to build 2,000 or 3,000-bbl. refinery near crude production for local distribution of product. Excellent opportunity for producer wanting further expansion of properties or more revenue from present production. Necessary crude contract be for minimum period of five years. Individuals making this inquiry have broad practical experience in all phases of refinery construction, operation and marketing. All replies will be held in strictest confidence. Box B-817 The Oil and Gas Journal, Tulsa, Okla.

WANTED: Oil or drilling company to join me in drilling test well on large, best located lease on Ocala Uplift in Florida. Entirely surrounded by Major Company holdings. Shallow production expected. Address Box 2293, Orlando, Florida.

PRODUCING MINE—STRATEGIC METALS Extensive ore-body defined; want reliable operator with necessary finance for substantial operations; reasonable terms. Box 1506, Denver, Colorado.

LEASES AND DRILLING BLOCK

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma

Louisiana and Illinois

20 Years' Experience

Inquiries Invited.

B. D BUCKLEY
60 Broadview Drive, Clayton
St. Louis, Mo.

FOR SALE: Oil and gas leases and producing leases with offsets to drill. All in shallow territory. W. P. Harley, Bowling Green, Ky.

NEW MEXICO
State Oil and Gas Leases

TWO DEEP TESTS UNDER WAY—one a 7,500 ft. test; the other a 6,000 ft. test. 40 acres and multiples thereof for sale in the HoT SPoT. Write for information. HARRY S. WRIGHT, New Mexico State Lessee. Farmington, New Mexico.

1,350-ACRE block in Young County, Texas, hot area. Production on all sides. Will make excellent deal for a well to be drilled to 4,200 feet which should test Marble Falls. Strawn sand possibilities are excellent, which formation should be found at approximately 3,750 feet. Box B-844, The Oil and Gas Journal, Tulsa, Okla.

NEW 55-acre, 10-year lease, located inside Paul H. Pewett's drilling block, Shelby County, Texas. Price $5 per acre. Write today for information. C. A. Parker, Box 451, Center, Texas.

FOR quick cash sale subject to core analysis, 320 acres with 26 producing wells, 8 abandoned wells, no dry holes; total depth 400 feet, gravity 29-30. Additional acreage can be leased to make a block of 250 acres proven for flooding, wells have been pumped for 20 years, no pressure ever applied to sands. Location, Miami County, Kansas. F. W. Black, Paola, Kansas.

ARKANSAS-Louisiana-Texas leases twenty acres up. Dollar acre up. Owners Box 1122, Little Rock, Arkansas.

FOR SALE: Large oil and gas lease of 17,671 acres located W. Va. Practically proven for gas, ready market. J. H. Harmon, 235 Sturges Ave., Mansfield, Ohio.

DEALERS, Oil and Gas Leases: Get in touch with us for leases inside drilling blocks in Kentucky at once. Prices right, real oil play in the making. Dobbs Oil & Gas Co., 504 Wilson Bldg., Dallas, Texas.

DEALERS, oil and gas leases. Will sell half interest in three blocks of 1500 acres each, central west Texas county, strawn sand test. Have rig on ground ready to go. P. H. Gunther, 4419 Bowser Street, Dallas, Tex.

MISSISSIPPI

The coming new oil state. Buying orders given prompt attention. M. Lerew, 602 Standard Life Bldg., Jackson, Mississippi.

LEGAL BLANKS

OIL FIELD LEGAL BLANKS

Leases, assignments, releases, towaship plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

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CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit 1, Mich.

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Journalisms:

OPERATION of a butadiene plant by Southern California Gas Co. will be described in next week's issue by H. L. Masser, vice president of the company. The plant will use a charging stock of naphtha from local refineries and gas from the company's remodeled gas generating plant. Capacity will be about 35,000 tons of butadiene annually.

PLASTICS have been used successfully in plugging oil wells in the East Texas area. Procedure and results will be described in next week's Journal by J. E. Bailey and Charles E. Dimit of Tide Water Associated Oil Co. The success of the method compares favorably with that of cementing but the older method is preferable in many instances.

CALENDAR

October

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, petroleum division, fall meeting, Ambassador Hotel, Los Angeles, Calif., October 21-22.

NATIONAL STRIPPER WELL ASSOCIATION, annual meeting, Blackstone Hotel, Fort Worth, Tex., October 25.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA annual meeting, Fort Worth, Tex., October 25-27.

PETROLEUM DIVISION NATIONAL ASSOCIATION OF CREDIT MEN, annual conference, St. Louis, Mo., October 25-27.

AMERICAN GAS ASSOCIATION, twenty-fifth annual meeting, Jefferson Hotel, St. Louis, Mo., October 26, 27 and 28.

MID-CONTINENT OIL AND GAS ASSOCIATION, Louisiana - Arkansas division, Slattery Building, Shreveport, La., October 29.

November

SOCIETY OF AUTOMOTIVE ENGINEERS, Mayo Hotel, Tulsa, November 4-5.

CALIFORNIA NATURAL GASOLINE ASSOCIATION, fall meeting, Biltmore Hotel, Los Angeles, Calif., November 5.

AMERICAN PETROLEUM INSTITUTE, twenty-fourth annual meeting, Palmer House, Chicago, Ill., November 8-11.

the OIL AND GAS JOURNAL

published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE ST., TULSA, OKLAHOMA

Subscription price, United States and foreign, 1 year, $6.00; 2 years, $10.00; 3 years, $12.00; 5 years, $15.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1943, by The Petroleum Publishing Co.

Vol. 42, No. 25 October 28, 1943

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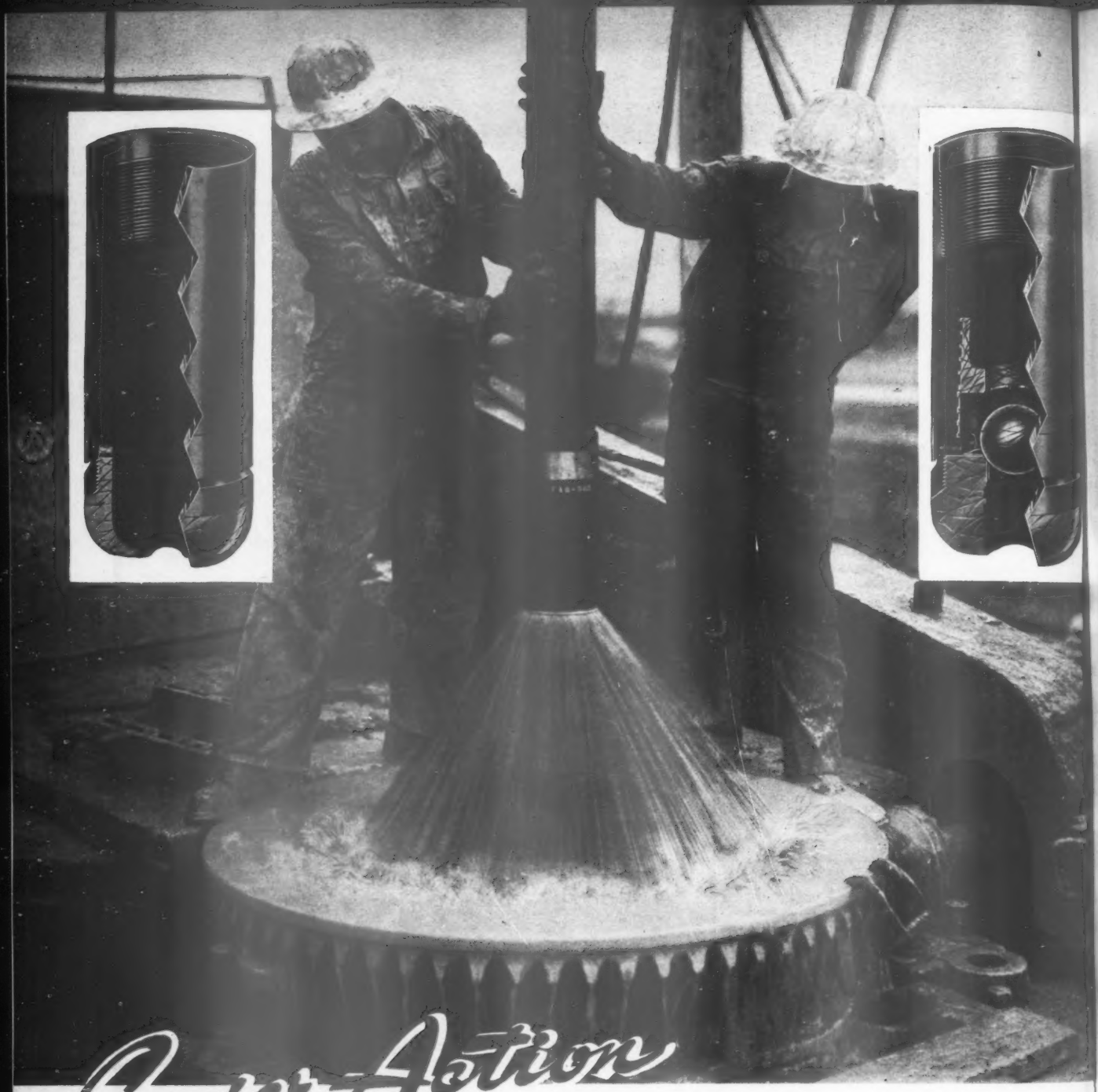

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the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States — Page 86

CRUDE-OIL STOCKS 233,997,000 bbl., as of Oct. 16—up 526,000 bbl. One year ago 238,118,000 bbl.

GASOLINE STOCKS 68,182,000 bbl. as of Oct. 16—down 1,526,000 bbl. One year ago 76,587,000 bbl.

RESIDUAL FUEL-OIL STOCKS 65,518,000 bbl. as of Oct. 16—down 1,067,000. One year ago 78,762,000.

GAS OIL AND DISTILLATES 42,237,000 as of Oct. 16—up 933,000 bbl. One year ago 47,258,000 bbl.

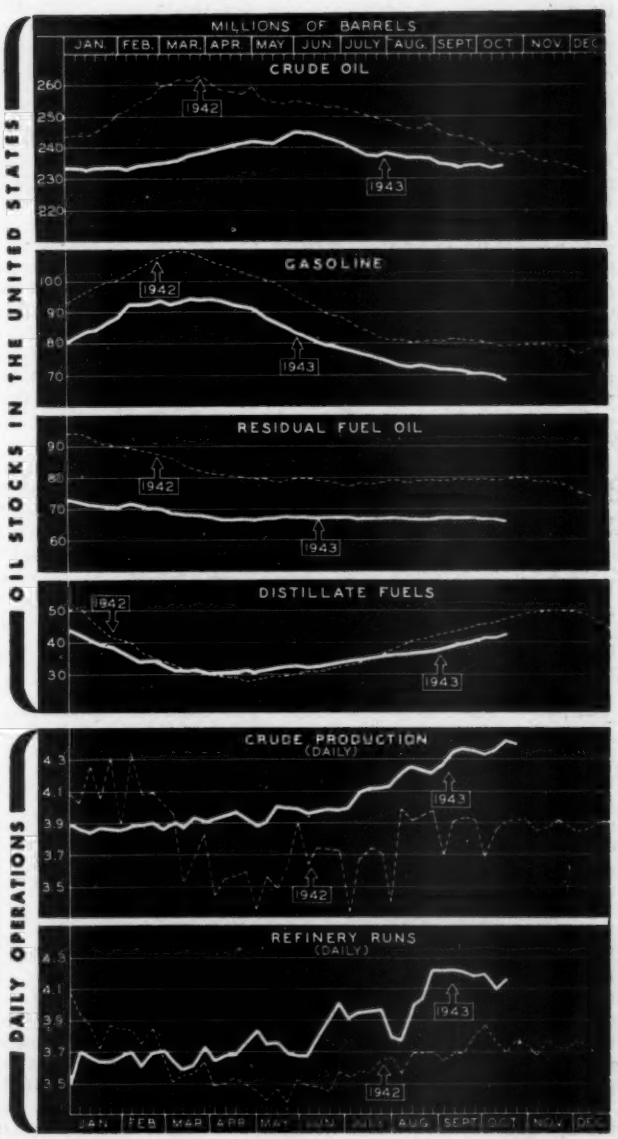
CRUDE-OIL PRODUCTION 4,415,000 bbl. daily average—down 23,035 bbl. One year ago 3,925,020 bbl.

REFINERY RUNS 4,171,000 bbl. daily week ended Oct. 16—up 77,000 bbl. One year ago 3,708,000 bbl.

DISCLOSURE that the Petroleum Administration for War has recommended modification of M-68, the spacing order limiting development wells to 40 acres in most areas, gives producing operators new hope that their efforts for remainder of the war will be less difficult. Ralph K. Davies, deputy petroleum administrator, admitted before the Lea petroleum subcommittee of the House that M-68 had proven unwieldy. He cited the issuance of 3,770 exceptions to the spacing order as confirmation of the conclusion that changes are demanded commensurate with the improved availability of steel.

A PERTINENT report on spacing was issued last week by the Bureau of Mines, although it is unrelated in most aspects to M-68. Two of the Bureau's petroleum engineers found that the estimated ultimate recovery from the so-called fault-line fields in Texas—Mexia, Wortham, Currie, Richland and Powell—appears to favor closer spacing. Of the five fields studied, Richland, where wells were drilled to an average density of 1 to 2.4 acres, the estimated ultimate recovery per acre-foot will be 1,383 bbl. The Richland curve contrasts with the least attractive record of Mexia where the bureau engineers calculate the ultimate recovery at 676 bbl. per acre foot. Likewise, Mexia, the largest of the five fault-line fields, had the most widely spaced development pattern, an average of 1 well to 6 acres. The well spacing (acres per well) and the estimated ultimate recovery per acre-foot for the five fields, in that order, are reported: Mexia, 6 acres, 676 bbl.; Wortham, 2.1 acres, 1,245 bbl.; Currie, 5.8 acres, 770 bbl.; Richland, 2.4 acres, 1,383 bbl., and Powell, 3.5 acres, and 939 bbl. Depletion of recoverable oil in the five fields ranges from 95.2 per cent at Mexia to 98.4 per cent at Richland, indicating that the data are reasonably conclusive.

THE technical report points out that nothing in the record of the five fault-line fields indicates that ultimate recovery will be lessened by close spacing and unrestricted production. On the other hand, there are no data to show what the fields would have produced under restricted rates of flow. Ultimate recovery, the engineers point out, already exceeds the expectations from comparable fields where wells are more widely spaced. The engineers caution, however, that indicated conclusions may be distorted by the exceptional natural water drives prevailing in the fault-line area and that under other conditions the final results might be different.



Vinson Opposes Oil-Price Relief by Legislation

WASHINGTON, D. C.—Opposition to legislative interference with the price-control machinery established by executive order was voiced here last week by Fred M. Vinson, director of the Office of Economic Stabilization. His views were expressed before a Senate committee which is considering the Thomas bill which would prohibit the Office of Price Administration from fixing crude-oil ceilings below specified levels.

Congress is considering other similar bills which would lift the ceiling on crude oil and probably on refined products to levels comfortably above those imposed by OPA.

Judge Vinson expressed fear that removal of crude-oil price control from OPA or circumscribing legislation of any sort would open the flood gates now blocking inflation. He did not specifically express opposition to higher crude-oil ceilings but categorically blasted all such means of tampering with price controls. He told the committee that passage of the Thomas bill freeing or modifying price ceilings on petroleum would invite the same form of treatment for every other industry in the country which is chafing under artificial restraint.

Meanwhile, there was no obvious break imminent in the stalemate between the Petroleum Administration for War and other government agencies over the price question. Judge Vinson has indicated that he would reach a decision within a short time on PAW's appeal from the OPA refusal to authorize a 35-cent advance in the crude-price ceiling. However, the economic director has set no specific date for his decision and the reports that his conclusion is imminent appears to be largely speculation.

Gov. Robert S. Kerr of Oklahoma last week visited President Roosevelt and lodged a personal recommendation for higher petroleum prices, explaining that the current shortage of crude oil would become more critical as long as producers are denied economic relief. Governor Kerr reported that the president was vitally interested in his explanation of the economic situation prevailing in the petroleum industry but that he was noncommital with respect to affirming or denying the justice of the appeals.

Priorities Assistance Order Simplified by WPB

WASHINGTON, D. C.—The Petroleum Administration for War has announced simplification of an oil-industry priorities assistance order and has issued a formal order controlling the use of materials in the refining and transportation branches of the industry.

The priorities assistance order (WPB's P-98-b) was amended, effective October 19, by WPB upon the recommendation of PAW. The object of the amendment is to shorten the order and simplify its language so that its provisions are more easily understandable.

Under the changes, to obtain ratings on items on WPB's List B of Priorities Regulation 3, operators must now follow the special delivery order filing procedure, which requires that all delivery orders must be cleared through the PAW Washington office for approval prior to placement with supplier.

Under the amended order, operators who drill less than 40,000 ft. a year are urged to plan their material requirements on a quarterly basis, as do other operators under the Controlled Materials Plan.

Sam Peterson to Represent Illinois on Oil Compact

SPRINGFIELD, Ill.—Governor Green of Illinois has appointed Samuel F. Peterson of Springfield as his representative on the Interstate Oil Compact Commission to succeed Clarence T. Smith of Flora, who resigned on account of ill health.

S. F. PETERSON

The new representative has served as petroleum engineer of the Oil and Gas Conservation Division of the Illinois Department of Mines and Minerals since November 1941 when the division was created.

He studied petroleum geology and engineering at the University of Chicago and Armour Institute of Technology. He was employed as chief geologist by the Barnsdall Oil Co. prior to joining the Atlantic Gulf West Indies Co., with which he spent considerable time in Mexico. During the period from 1921 to 1939 he was an independent oil and gas operator in Oklahoma and Kansas.

Better Steel for Oil Tools Now in Sight

OWENSBORO, Ky.—Better steel for pumping rods, drill bits, drill collars and tool points will be available soon, according to H. N. Pardee, vice chairman of District 2 production committee, which met here October 9. Mr. Pardee told the committee that rotary bits and tool joints now in use are not of standard quality, thus increasing drilling time, hazards and delays. This combined, with inefficient labor, has contributed to the cost of drilling.

Crude production in District 2 continues to decline, further alarming refiners. If no new production is found soon, Mr. Pardee said, it will be necessary to bring crude in from other districts.

Pressure Maintenance Proposed at Magnolia

EL DORADO, Ark.—Already engaged in launching a general secondary-recovery plan, Arkansas now is committed, through its Oil and Gas Commission, to another program to foster salt-water disposal and pressure maintenance projects.

O. C. Bailey, chairman, committed the commission to such a program at the state-wide hearing October 20 at Magnolia, Ark., and then, in line with his opening statement, the commission placed its stamp of approval on one such project in the Midway field of Lafayette County, and at the same time started action to bring about a similar arrangement at Magnolia.

Magnolia field operators made a report on the progress of their efforts to start pressure-maintenance activities and the commission took steps for a meeting of officials of operating companies to decide on a definite program. It was indicated by the operators that they favored drilling of new injection wells instead of utilizing old wells in the field. Preliminary estimates placed the cost of the project, involving four wells, at $400.000.

With only one change—reduction of 1,000 bbl. in the Jones sand pool of the Shuler field for more efficient operation of the unit—the state's allowable for the next 3 months was set at 81,000 bbl., in keeping with the recommendations of federal petroleum authorities.

Press Association, Inc.

Flexibility of the Army's portable pipe line is displayed by this simulated bomb burst beneath a suspended section thrown across water by engineers training at Camp Claiborne, Louisiana. Elasticity of the line protects it from damage by bombs and artillery shells unless a direct hit is scored

THIS WEEK

PRODUCTION—Discoveries, or indicated discoveries in widely scattered states marked the week as outstanding for the year. . . . Humble's Florida well opens up vast possibilities. . . . Wildcat well projected for Maryland. . . . New discovery in Nebraska, others in West Texas—all contribute to an unusually active week. . . . ¶PAW discloses more details on program for South American and Middle East producing countries, increasing their contributions to the war. . . .

TRANSPORTATION—Tanker movement of 210,000 bbl. daily by coastwise tankers during September breaks military secrecy on this traffic. . . . September shipments by tanker highest since August 1942. . . . ¶Laying work on eastern leg of WEP 20-in. products line to be finished in November. . . . ¶Pipe-line companies arranging West Texas systems to feed Stanolind Pipe Line Co. and Magnolia Pipe Line Co. arteries when they are available next spring. . . .

REFINING—Sinclair Refining Co.'s aviation-gasoline plant at Corpus Christi near completion. . . . ¶Deputy Administrator Davies discloses expansion at Abadan refinery, on Persian Gulf, will increase aviation-fuel production. . . . New facilities proposed at other Persian Gulf points accessible to producing fields. . . . PAW uncertain whether program can be completed in time to play important role in war or to bring about substantial relief on this country's supplies and facilities. . . .

EQUIPMENT—Industry's chief priority order, P-98-b, amended, giving moderate liberalization in methods of acquiring and utilizing materials. . . .

SPACING—Modification of M-68 spacing restrictions, officially designated now as PAO 11, is in the works. . . . Deputy Administrator Davies admits unwieldiness of original order, cites issuance of 3,770 exceptions as confirming evidence. . . . ¶Improved availability of steel, proof spread before WPB and military services on needs, combine to unstop reluctance to give industry tools it requires. . . . ¶Shortages persist in many items but over-all outlook is decidedly improved, and will become easier. . . .

PRICES—Fred Vinson, director of economic stabilization, opposes legislative molestation with price ceilings. . . . Warns that congressional action on one commodity will precipitate demand for similar treatment by all industries, opening the funnel of inflation. . . . . ¶President Roosevelt listens attentively to plea for higher crude ceiling by Gov. Robert S. Kerr of Oklahoma, but makes no commitment. . . .

G. J. O'Brien, vice president Standard Oil Co. of California, greets Amir Khalid and Amir Faisal, sons of Abdul Aziz Ibn Saud, king of Saudi Arabia, when they visited California last week. Their country is one of the potentially important producing countries in the Middle East. California Arabian Standard Oil Co., which holds a development concession on practically all of eastern Arabia, is jointly owned by Standard of California and Texas Co.

Facilities Expanded in Middle Eastern Fields

by Henry D. Ralph

WASHINGTON, D. C. — A general review of the petroleum situation in the United States as of this fall was obtained by the petroleum subcommittee of the House committee on interstate and foreign commerce during 2 days of hearings last week.

Witnesses were representatives of the Petroleum Administration for War and the Petroleum Industry War Council, and the purpose of the hearings was to bring the committee down to date in its continuing surveillance of the oil industry.

Discussion covered all phases of the industry, including prices, exploration, production, transportation, civilian supply, military demand, and foreign developments.

The principal presentation was by Ralph K. Davies, deputy administrator, who read an extensive statement which was supplemented by various members of the PAW staff who were present to answer questions. Mr. Davies also submitted a memorandum on the petroleum situation in the Middle East which disclosed that additional facilities are being constructed in that area but concluded that war conditions will determine how much such supplies will relieve the drain of United States oil.

W. Alton Jones, chairman of the Petroleum Industry War Council's transportation committee, presented a series of charts to illustrate the changes war has caused in methods of supplying the East Coast, and he revealed that ocean tankers are now carrying about 14 per cent of this movement.

John D. Gill, chairman of the PIWC committee on cost and price adjustment, outlined the industry's case for a higher ceiling price for crude oil, and found the committee very sympathetic to these views.

Mr. Davies' statement stressed the facts that military demands are tremendous and scheduled to increase, production of crude is close to its maximum level, new discoveries are disappointing, and there is little likelihood that the supply of gasoline for civilians will be any higher in the near future. He said additional civilian cuts probably would not be necessary this year.

He also defended the actions of PAW in restricting the use of steel in drilling, disclosing that at the beginning of the war the War Production Board proposed to deny the use of any steel whatever for oil production because of a widespread impression that all petroleum needed for any purpose could be obtained simply by opening existing wells.

Oil production and refining levels are at all-time peaks, Mr. Davies told the committee. Approximately 4,350,000 bbl. of crude oil are produced daily, which is close to the limit from known reserves, with the exception of West Texas fields.

Operations of PAW have been brought up to date in this report. Deputy Administrator Davies hints at the current production of aviation gasoline and tells of plans for foreign oil expansion.

Gasoline Consumption Excessive

Allocations of all available gasoline are being made, but consumption is greater than allocations. This, as explained later in the hearing by Walter Hochuli, director of marketing for PAW, is the result of overissuance of gasoline coupons by OPA. On the East Coast, consumption exceeds allocations by an average of 50,000 bbl. a day. Black-market activities may have some bearing on this, it was brought out, but no evidence is available on that factor.

As to future gasoline supplies for consumers, Mr. Davies said, "I cannot be optimistic. The situation will be no better. Possibly there will be less gas, and the quality may be poorer."

The question of quality of gasoline was discussed at length. Complaints about poor quality of gasoline result from motor conditions rather than the gasoline itself, Mr. Davies and his staff said. Today's gasoline has an average octane rating of 72-73, the same as before December 7, 1941.

Reduction in the octane rating of premium gasoline will be made immediately, Mr. Davies said. This is a "cushion" against lowering the quality of regular gasoline.

War shifts may cause further change in amount and quality of civilian gasoline, Mr. Davies said. Progress in transportation under wartime circumstances has increased the amount of overland and inland waterway movement of oil from a prewar rate of 50,000 bbl. a day to better than 1,400,000 bbl. daily. Specific increases cited by Mr. Davies included:

Rail, from 5,000 bbl. daily to a peak of more than 1,000,000.

Pipe line, from 42,000 bbl. daily to last week's record of 406,000 bbl. daily.

Barge, from 64,000 bbl. daily in April 1942 to 168,000 bbl. daily.

The price increase of 35 cents a barrel on crude oil recommended by PAW and currently under consideration by Judge Fred Vinson, director of the Office of Economic Stabilization, was in general approved by the committee, and, according to Donald R. Knowlton, director of production for PAW, by the oil industry in general.

A price increase is needed, Deputy Administrator Davies said, as a stimulus to further exploratory activities, and to encourage more widespread use of secondary-recovery methods to supplement the declining natural production.

"We believe," Mr. Davies said, "that a price increase would produce the greatest results in the least time at the most reasonable cost and with the fewest administrative difficulties."

Price Structure Reviewed

The entire question of price structure, compensatory payments to offset the increased cost of rail and pipeline transportation, and price increase versus subsidies was reviewed with Rep. Charles A. Wolverton of New Jersey, Rep. Lyle H. Boren of Oklahoma, and others of the committee questioning Mr. Davies.

Increased prices to the producer, the deputy administrator said, would increase production of existing wells, and stimulate wildcatting and secondary recovery. While wildcatting and development of known resources has continued, discoveries have declined. In wildcat operations, finding of oil is one-third of what it was several years ago. In 1931 the average field discovered contained 20,000,000 bbl. of reserves. In 1942 new fields had dropped to an average of 2,000,000 bbl.

The development program was decreased, under Conservation Order M-68, the 40-acre spacing order. This has proved unwieldy, as 3,770 exceptions granted would indicate. This order, Mr. Davies said, is being relaxed as steel for development drilling becomes more available.

The wildcat drilling for 1943, D. R. Knowlton, PAW director of production, said, is estimated at 3,400 wells instead of the programmed total of 4,500.

About 19,000 development wells are anticipated this year.

Suggesting that a price increase of 35 cents a barrel, or an estimated $360,000,000 a year would be paying too dearly for increased production which would not be felt for at least a year or two, Representative Wolverton asked whether subsidies might not be cheaper. He was told that subsidizing 296,000 stripper wells and 18,000 production operators was an administrative impossibility. It was also pointed out that this would in effect be paying two prices for oil, a higher price for marginal oil than for flush oil in the same field.

Compensatory payments of $25,000,000 have been paid as the differential between costs of tanker and rail shipments to the East Coast, J. R. Parten, director of transportation for PAW, testified. Of this, consumers have paid $16,000,000 in increased gasoline prices.

West Texas Differential Favored

Asked the difference between paying a tank-rail differential and paying Midwest refiners a differential as an incentive to increase the use of West Texas oil, Mr. Davies said that his office saw no difference, and that such payments had been recommended within the past 2 weeks.

Increased use of Caribbean area oil for overseas shipment was discussed by the committee. Currently, Mr. Davies said, 630,000 bbl. daily of Colombian and Venezuelan oil are being produced, and an additional 350,000 bbl. daily are expected, making a total of 1,000,000 bbl. from that source. This, however, is not sufficient to remove the need for increased production here.

"Today's price will determine oil production a year hence," Mr. Davies told Chairman Lea.

Protection of the small filling station operator from discrimination where gasoline shortages exist is not the responsibility of the PAW, Mr. Davies told the committee, although his organization had recommended a limitation order to assure equal distribution to all retail outlets. This, he said, had been turned down by the War Production Board, at the request of Leon Henderson, then a member.

Commenting upon this as a further example of differences in policy among government agencies, Representative Wolverton said:

"We could have been far more efficient in administering the petroleum problem if we had had a centralized authority rather than a divided authority. I think that your organization, under Secretary Ickes, has been far ahead in appraising problems and providing a solution, and that it would not be amiss if consideration were given to setting up a central organization with Mr. Ickes at the head."

For the most part, committee members and witnesses were in accord in the hearing, but when Rep. Clarence J. Brown of Ohio began a series of questions designed to show which members of Mr. Davies' staff came from major oil companies, the PAW was under fire. Going down the list of staff members present, Representative Brown asked each about his affiliation with a previous employer, his salary, payments from an oil company in the form of severance pay, or stock dividends.

(Continued on page 100)

PAW'S Middle East Memorandum

APPROXIMATELY two-thirds of the Middle East crude-oil production comes from the oil fields of Iran (Persia). This crude oil is shipped by pipe line to the refinery at Abadan, on the Persian Gulf, which is the largest refinery in that area. It is rated as having an input capacity of 235,000 bbl. daily, based upon the maximum production of 100-octane aviation gasoline.

During the past summer, the Abadan refinery processed crude oil at a rate equal to about 80 per cent of its input capacity. Its capacity will be increased as additional aviation-gasoline units are completed.

Other refineries in the Middle and Near East include those at Tripoli, in Syria, and Haifa, in Palestine, which are supplied with crude oil by pipe line from the oil fields of Iraq (Mesopotamia); on Bahrein Island, in the Persian Gulf, which is supplied with crude oil from Bahrein and nearby Saudi Arabia.

With the improvement in tanker availability, which has resulted primarily from the construction of new vessels and the decrease in losses from enemy attacks, the Petroleum Administration for War, the Army-Navy Petroleum Board, and the Office of the British Petroleum Representative, have worked to maximize supplies from the Middle and Near East for the fighting theaters.

Specific steps have been taken to provide additional supplies of products which can be utilized to advantage from Middle and Near East refineries to the full extent of refinery capacity and available stocks. It has been the constant objective of the PAW, in close cooperation with the representatives of the military and other government agencies, as well as with the foreign governments concerned, to increase the utilization of the petroleum resources and facilities in the Middle and Near East.

The construction of additional refinery capacity in the eastern Mediterranean and Persian Gulf areas is being expedited.

Independent Association Decides to Take Fight for Higher Prices to the Public

by C. O. Willson and Harry F. Simons

FORT WORTH, Tex.—The foundation was laid here this week by the Independent Petroleum Association of America at its annual meeting to carry its fight for higher crude-oil prices to the general public, using all media of communication. Directors of the association, in a mood to take whatever steps are necessary to correct the disparity between petroleum prices and other commodities and to elevate revenue to the level dictated by rising costs, approved the educational program to enlist support of the public.

Hopes for relief through congressional action are not entirely abandoned but members of the I.P.A.A. are fearful that the legislative machinery will prove too cumbersome and slow moving to correct price conditions threatening them with extinction.

C. E. Buchner, Tulsa, executive manager of the association, outlined the program for informing the public of the factual conditions which he said are defeating the industry's efforts to meet the rising demand for crude oil and products. The oil shortage, he said, is partly because of higher consumption brought on by the war but more specifically "is the direct result of the suspension by the Office of Price Administration of the law of supply and demand and suppression of free enterprise."

Abstracts of several papers presented at the National Stripper Well Association and the I.P.A.A. meetings are presented in this issue. Included are those by Messrs. Buttram, Franklin, Thompson, Delaney and Andrus. They will be found on pages 31, 32 and 39.

Ralph T. Zook, Bradford, Pa., president of Sloan & Zook, was elected president of the I.P.A.A., succeeding Frank Buttram, Oklahoma City, Okla. Staff officers of the association, including Mr. Buchner; Russell B. Brown, general counsel, and H. B. Fell, Ardmore, Okla., executive vice president, were reelected.

Earlier, J. D. Sandefer, Breckenridge, Tex., was elected president of the National Stripper Well Association, succeeding C. P. McGaha, Wichita Falls, Tex. Mr. Fell also was elected executive vice president of the stripper-well group and Howard J. Whitehall, Tulsa, was elected secretary-treasurer.

Mr. Brown urged renewed vigor in fighting for higher crude-oil prices in his discussion of "Industry-Government Relationship" in which he outlined the numerous discouraging rebuffs to the association's efforts to obtain favorable action from the OPA Congress and other governmental agencies. He warned that the independent operators must remain strictly on the alert for future attacks on the depletion allowance.

He branded the current philosophy of government, as reflected by OPA's assumption of authority over balance sheets, as a threat to the economic structure of this country and against long-established institutions.

Paul Ryan, Cleveland, Ohio, chairman of the Petroleum Industry War Council's subcommittee on postwar planning, cited the growth of government investment in industrial plants and said that one of the big problems of the future is how these facilities may be absorbed by private companies. Serious consideration of this problem, involving synthetic-rubber plants, aviation-gasoline refineries, pipe lines and similar facilities was urged by Mr. Ryan, who said the utilization of these installations after the war would have an important bearing on welfare of the entire petroleum industry.

R. J. St. Germain, Houston, Tex., congratulates Ralph T. Zook, Bradford, Pa., on his election to the presidency of the I.P.A.A.

Operators Throttled By Regimentation

by W. A. Delaney, Jr.

THE regimentation that vexes and perplexes the business man, confuses and befuddles the independent oil producer. There is no magic formula that will relieve the oil man from bureaucratic control, regimentation and ultimate bankruptcy, that will not, at the same time free others who are the victims of similar oppression.

Small business, to exist, must be free business. It cannot survive in a controlled economy. Most independent oil producers are small business men, at least in a relative sense, because they are merely suppliers of one of the raw materials utilized in a huge, integrated business. They are the sharecroppers of the petroleum industry. They must at all times dispose of their production to an integrated company, whose interest motive is profit from transportation and

manufacture. The principal economic excuse for the existence of the independent, in his willingness to risk "venture capital," and his ability to find new reserves of oil.

As a result of the ill-considered policies of government agencies, we are facing an acute oil shortage in the greatest oil-producing country in the world. The correction of this evil condition presents a problem that is too big for solution by the industry alone. It will require the concerted effort of every sound thinking American, whether laborer, farmer, business or professional man before we can return to the way of free enterprise and liberty of action in business. The collectivists have diligently spread their doctrine and have accomplished much.

Governmental price control, and regimented productive effort, mean an inevitable decline in productive output. And the more stringent the penalty for violation of regulatory order, the more quickly will ensue the famine that must surely follow.

The number of wildcat wells are not being drilled that should have been drilled, to maintain our necessary reserves. They cannot and will not be drilled under present restrictive price regulations on crude petroleum and daily mounting operational costs in that branch of the industry.

Buttram Commits Industry to Dispatch War Duties Despite Price Handicaps

*by Frank Buttram**

WE who produce the oil which streams to the thousand points of battle resolved in our hearts and in our uttered words that each last ounce of energy would be cast into the scales. This we have done and this we will continue to do. Let there be no misunderstanding on that point. If such energy wanes through the machinations and the purblindness of some who have been set temporarily in places of authority, an accounting will be demanded by an entire people whose sons' lives are thus lightly held.

We all foresaw that the production of great enough quantity of petroleum would call for the exertion of all of all our strength. We knew what to do and how to do it. The doing, we knew, would require more money than the then—and present—subnormal price would permit to be expended. So, we sought a correction at the hands of those whom we had been directed to consult.

The refusals were varied. Sometimes we were told curtly to cease bothering these busy men. At other times we were told that deep and most concentrated study was being given to our proposal. Finally, it was arranged that the U. S. Tariff Commission would make a study to see whether oil was costing more or less than at some other time.

I will give you my opinion of the Tariff Commission's report. It was a "boilerhouse job." It ignored too many realities in the producing business to be of any use as an index to the relationship between the price of oil and the cost of producing and finding it. But the report prevailed in the price-fixing branch of the war Government and it is still quoted as the eternal, immutable and all-encompassing pronouncement on the price of oil.

Before the report was made, committees of the Congress began to manifest concern in the oil supply. They were hesitant to make of the oil question the kind of issue that would have diverted attention from what were considered to be matters of greater urgency.

It may be that the course they chose was wise. They might have effected a correction in the price situation, to have legislated a higher price for petroleum and the supply would not be greater. But to have done that would have been to open the door to demands for legislated price increases in every line and commodity and at a time when the people of the nation were unconvinced of the greater urgency of the oil situation. I believe they are now convinced and I believe that most of the consumers have placed or shortly will place the responsibility for the oil shortage squarely where it belongs.

The many investigations which the Congress had made into the oil industry within little more than a year have reared a mountain of evidence that our cause was and is just. The evidence is incontrovertible. Indeed, the Office of Price Administration has never attempted to deny it. The sophistries and the mendacities which have poured from that agency in a steady stream have rarely been tinged by truth. Driven from one untenable position to another, each passing week saw a new excuse for failure to perform.

They knew all about prices, nothing about values. It has been an economic smorgasbord that has been spread before the nation. It has a little of everything in it. It has been boasted that the consumer has been saved enormous sums of money, in relation to what might have happened except for the wise interposition of the OPA into affairs of ordinary, routine business conduct and productive effort. Some controls were necessary, but the details of the job have been permitted to obscure the objectives.

We are combating, among other

C. P. McGaha, Wichita Falls, Tex., explaining some of the duties of office to J. D. Sandefer, Jr., Breckenridge, Tex., who was elected president of the National Stripper Well Association

*Retiring president, I.P.A.A.

things, a theory that has been heard more and more frequently in the past year, and which has obtained some degree of acceptance, that we have exhausted our principal petroleum resources. We in the industry do not believe this. Such utterances are not new. The public is being told that there is little left to find. The rest of the warning is that we must rely upon the oil resources of the foreign countries and save our own. Of course, if we rely upon foreign oil and thus then end our own efforts at home we will never know whether we have unfound reserves. In this emergency, we need imports but we will insist that no permanent program be established that will end our domestic development.

Underlying our common task of finding the new fields and of producing the discovered reserves, we will continue to encounter problems, economic and political, that must be solved. Today, we seek the means of saving the nation from an oil shortage of such proportions that we almost shrink from the mere contemplation of it. The danger is at hand, not in the future. The whole conduct of the war is involved and the whole of postwar reconstruction.

Problem of Taxation

We face the problem of taxation. We know of the stupendous cost of this war. We know that national honor will compel the liquidation of the debt, without resort to fiscal legerdemain.

We may and very likely will face the problem of some form of highly centralized control of our industry, either the regimentation and the direction of our operations or outright nationalization. Both proposals will be advanced. There will be attempts made to lay the blame for the oil shortage in the United States upon the oil producers. We must keep that record posted and down to date and we must make known the fact that the failure was not ours; that our warnings were given while it was yet early.

We face still the problem of the depletion allowance. On several occasions we have had to protect this, reasonable and workable method of providing for return of invested capital. The threat is still present, notwithstanding the repeated decisions of Congress to let the tax provision stand. There is also the recurring attempt to nullify by regulation the expense and capitalization option, as well as efforts to alter the depletion allowance itself by regulation and interpretation.

We have the problem of the return to our states the authority over conservation. The petroleum administrator has said that his only desire is to return to the industry its effects and its freedom when the necessity shall have passed. Will there be others, though, who will seek to make this control permanent and to end the functioning of our local governmental agencies?

Certain other problems can be presented by suggestion only at this moment. For example, what is to become of the government-financed pipe lines? What will be their disposal and how will they affect the transportation of the crude oil we produce? What of the huge tanker fleet built and still building? There will be the demand for its utilization and this again brings us to the matter of imports.

For the present, our greatest task is to produce all the oil we can and thus do our part in bringing the war to a victorious close. But we may well look to the future and to our plans and preparations for meeting the many problems, some of which I have attempted to suggest.

Postwar planning has not been entrusted solely to a few by any law. Any planning and any execution of a plan is our business and it is the business of all Americans. I, for one, am not willing to stand mute and entrust all to the wisdom of a few, no matter how wise they may be, or proclaim themselves to be. This is something that concerns all of us and all of our descendants. We must know that any decisions made, any plans offered, shall be given full and free discussion.

Franklin Blasts Subsidies

by Wirt Franklin*

THERE are more than 30 refineries in District 2, among the smaller plants, which are without an adequate supply of crude oil to keep them in operation on a break-even or profitable basis. Some are in such straits that they cannot much longer be kept in operation. Their combined capacity is upwards of 200,000 bbl. daily.

Untried substitutes are uncertain. We don't know what they would accomplish, and in the midst of war we have no right to rely upon untried means.

I do not believe that subsidies would get the job done. The granting of a loan by the Government to drill a wildcat well, not to be repaid if the well is a dry hole, would, in all probability, bring a horde of city slickers and promoters. "Wildcat" wells would be drilled with the obvious intention of getting the subsidy instead of finding oil.

Our discoveries have been largely of small pools, which have not added a great deal to our reserves. What we have to do is to turn loose a veritable avalanche of wildcat drilling. There is conclusive evidence that the best way to find oil is to drill for it.

Under such control as we had during the other World War, the price of Mid-Continent oil was frozen at $2.25 a barrel. That is $1.08 more than the $1.17 which is the present posted price for Mid-Continent crude of 36 gravity. I mention this to illustrate how low the price of crude oil is today. It is at the bottom of the commodity index; and when Mr. Henderson, as price administrator, fixed prices at existing levels of October 1, 1941, they were frozen on a subnormal basis, in reality on a depression level.

*Special field assistant to the deputy petroleum administrator.

What happened after controls were released in 1918? We then faced a shortage of oil, even for peacetime requirements, so the tried and true method which had been in vogue for 50 years or more in this country was resorted to, to increase production and the discovery of new oil. The price of crude was advanced 25 cents at a time until it reached the all-time high of $3.50 a barrel for Mid-Continent oil, and in some fields with especially high-grade oil, premiums ranging from 25 cents to $1.50 a barrel were paid over and above the posted price. It started a veritable epidemic of wildcat drilling.

Of the reserves we have today—the 20,000,000,000 bbl. of reserves of which we boast—nearly 75 per cent was found by the little fellows drilling wells on a "hunch."

You can afford to take a chance. Every operator has some favorite spot where he wants to drill a wildcat well. I plead with you not to longer delay action. Go ahead.

Engineering Skill Vital in Success For Repressuring

by D. T. Andrus*

WE have heard much about the Bradford and Alleghany operations. Why such a reputation as a flood area?

It is an enormous area of thick sand body; an area of good sand permeability, quite uniform and high

(Continued on page 39)

*President, Pennsylvania Grade Crude Oil Association, Bradford, Pa.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

No Need for Props

THE veil of secrecy which the Government has hung around the activities of Petroleum Reserve Corp. and other war agencies concerned with the international aspects of petroleum's contribution to the war is posing many questions most of which possibly would not be raised if facts were known.

As a result, in some quarters, the worst possible interpretation is being made of the program which has for its announced objective the greater equalization of the burden of furnishing Allied oil.

There does not appear to be any reason why the expansion of petroleum supplies outside this country should differ essentially from the domestic program either for the emergency or during the postwar period.

Domestic operators have given their full support to the military plans which necessitated the construction of war-product plants and brought major changes in transportation operations. There is the definite promise from the Government that these units, when they have served the emergency, will be made available to private operators on a basis of their worth in peacetime. If some have no value then the quicker they are junked the better.

There can be no objections to the application of a similar program in foreign operations assuming that the war need has been established and conditions are such that the expansion cannot be carried on by private owners at this time.

But no condition exists which would justify this nation acting alone or in cooperation with other powers, entering into a long-range program which would make government a partner in the development of oil properties at scattered world points long after peace has arrived.

Aside from the significance that such a program would have to the oil industry here and elsewhere, it involves changes in this country's foreign policy of far more importance than the present problem of supplying the oil requirements of the United Nations. Such a plan, if it exists, needs only the light of day to bring it to a quick end.

So far as the oil companies of this country are concerned they have given a good account of themselves in their activities outside this country. They have adopted the practices and customs of other countries. They have improved working conditions. They have brought all the services of this industry to remote areas and have expanded the wealth of many nations. In so doing they have made a major contribution to world trade and to the establishment of international good will.

With this background the contention of some that private operations in foreign lands need the protection of government participation is not convincing. There is nothing our Government could do as a partner in these operations which can't be done without such partnership, providing the Government desires to give its nationals the protection they are entitled to in maintaining and extending this country's dominance in oil.

The greatest contribution that Washington can make to the petroleum industry after the war is to reestablish it quickly as a free enterprise with the assurance that it will be permitted the price incentives to carry on oil operations wherever they are needed. When this is done the government props of the war period can be thrown away and any that may be under consideration for the future can be forgotten.

Secondary-Recovery Papers Feature A.I.M.E. Meeting

by L. P. Stockman

LOS ANGELES, Calif.—The southern California section of the A.I.M.E. presented a timely group of papers at the 1943 fall meeting here, October 21 and 22, and the attendance proved the wisdom of concentrating on operating subjects.

Of particular interest were the prepared and extemporaneous discussions that followed the formal papers.

Because of California's inability to step up crude-oil production to meet market demands, the papers on "Possible Application of Secondary Recovery Methods in California" by C. L. Moore of PAW and "Bituminous Sands and Shales and Partly Depleted Surface Sands as Sources of Additional Oil in California" by G. B. Shea of the U. S. Bureau of Mines were especially apropos and the symposium on "Problems of Artificial Stimulation of Production by Water Drive" was of outstanding interest.

Abstracts of the technical papers presented at the Los Angeles, Calif., meeting of the Petroleum Division, A.I.M.E., are published in the Engineering and Operating Section of this issue, starting on page 57. Highlights of the discussion following formal papers are covered in this summary.

California Problems Unique

This series of papers was especially timely because of the limited amount of secondary-recovery work undertaken in California up to the present time and because it has not been determined how many sands and fields in the state are susceptible of water flooding or air-gas drive. It appears certain that within the next year many of the questions regarding secondary-recovery in California will be answered by specific data obtained in the development and operation of a number of secondary-recovery projects already started in the state. No secondary-recovery program has yet been undertaken with residual oils having a reservoir viscosity above 500 centipoises. Viscosity values in California fields will run as high as 10,000 centipoises in some of the shallow low-gravity fields. These excessively high viscosities practically preclude successful application of current secondary-recovery methods.

The discussion of Mr. Moore's paper brought out a number of interesting factors. Water flooding, with varying success, is under way in nine states at the present time but the current scope of work can be expected to greatly enlarge inasmuch as there are 2,000,000 acres available for water flooding. Another interesting fact is that gas-drive fields offer the best chance for success and that water-drive fields offer very little encouragement for secondary recovery. One of the most interesting discussions brought out the fact that Union Oil Co. has started preliminary work toward the application of secondary recovery in the Richfield district of Orange County, California. In order to test out the possibility of increasing production by secondary recovery the company has started drilling an injection well. This well, located on the Chapman property, is far down structure where the regular pay zone is relatively thin so that if the test proves unsuccessful no great harm will be done the reservoir. It has been estimated that only about 20 per cent of the total oil in place has been recovered by primary production activities and the remaining 80 per cent would represent a major recovery if the newly started program is successful. Field waste water will be chemically treated before injection. Permeability is favorable and the only thing that remains to be determined is whether and how fast the formation will take water and what action the water will have on the oil content of the reservoir.

Bureaucratic Control Criticized

LOS ANGELES, Calif. — A warning that the petroleum industry's gravest postwar problem is the disengagement from binding restrictions was sounded here last week by A. C. Rubel, vice president of the Union Oil Co. of California, who spoke before the California chapter of the American Association of Advertising Agencies.

He reviewed how the shortages of steel and a popular misconception of the petroleum industry's producing operations had precipitated a current critical situation in the supply of crude oil.

If the industry is given an adequate price, Mr. Rubel told the advertising men, he can see no cause for concern about the postwar supply of petroleum. There will be plenty of petroleum available for postwar demand but, he said, it must be at a price which will justify the employment of more expensive means of production and substitution.

Mr. Rubel said that the oil industry could not function in a peacetime economy "in such a bureaucratic and alphabetical straight-jacket" as is now circumscribing all phases of operations.

"These regulations are needed, perhaps, in wartime," he conceded, "but we cannot function with them nor can any industry in a peacetime economy."

He listed 12 government bureaus whose rules and regulations have the most intimate bearing on operations of the petroleum industry as follows:

"The Petroleum Administration for War regulates our drilling, production, refining and marketing activities.

"The War Production Board regulates our supplies and equipment.

"The War Labor Board regulates our labor conditions and the wages paid.

"Selective Service regulates whom we may retain in our employ and who must be given up to the military service.

"The U. S. Employment Service regulates whom we may hire and fire.

"The Office of Price Administration regulates the prices on our raw materials and products.

"The Office of Defense Transportation regulates our overland transportation.

"The Security Exchange Commission regulates our corporate affairs.

"The Interstate Commerce Commission regulates our interstate business.

"The Treasury Department, through the medium of taxes, regulates our earnings and our profits.

"The War Shipping Administration controls our tankers and sea-borne commerce.

"The Bureau of Economic Warfare, in cooperation with the State Department, regulates our operations in foreign countries."

Retreating Unit Made Integral Part of New East Coast Aviation-Gasoline Plant

by J. P. O'Donnell

MARCUS HOOK, Pa.—An addition to the aviation-gasoline producing facilities of the Sun Oil Co. at its refinery here which will make possible a substantial increase in output of this vital war material was dedicated October 27. Principal units of the addition are a 6-case Houdry catalytic-treating plant, a large gas-recovery and stabilization plant and a hydrofluoric acid alkylation unit which is the largest plant of this type yet completed. Auxiliary equipment includes a steam-generating plant, water-supply system, tankage, pumphouse, water-treating unit, electric power substation, sewage disposal plant, office, laboratories and shop and warehouse facilities.

Plant 15 is distinctive in that it was the first unit of this type to go on stream that was designed primarily for the production of aviation gasoline. As such it embodies a number of modifications in design and operating conditions which differ from previous units which served primarily for the production of motor gasoline.

The Houdry section of the new plant will process once-through or single-pass gasoline produced in the other catalytic-cracking units in a second-pass operation. This retreating will produce aviation base stock of substantially higher octane value. In addition, the second-pass operation increases the concentration of desirable compounds, such as aromatics, and there is a higher isopentane content which results in better volatility. Impurities are almost completely removed.

Previously retreating or second-pass operations were carried out in the reforming section which was converted to this use and also in the later of the two 12-case catalytic-cracking units. This plant has been operated both as a cracking plant and as a retreater. First-pass products from this and other units were accumulated and then charged to the 12-case plant which then served as a retreater. Approximately twice as much time was devoted to first-pass cracking as to retreating. The once-through gasoline of the other Houdry units at Marcus Hook in addition to that produced at Sun's Toledo refinery were reprocessed in this manner.

Henceforth the production of aviation gasoline will be a continuous operation from the gas-oil charge to the finished product. Gas oil will be cracked catalytically in the previously installed Houdry units, reprocessed in the new unit, blended with alkylate and leaded to military aviation-fuel specifications. The rearrangement of the Marcus Hook refinery makes it primarily an aviation-gasoline plant with the production of motor fuel an incidental operation. Production of the latter will, in fact, be a byproduct operation with its volume controlled entirely by aviation-gasoline requirements.

Self-Contained Operation

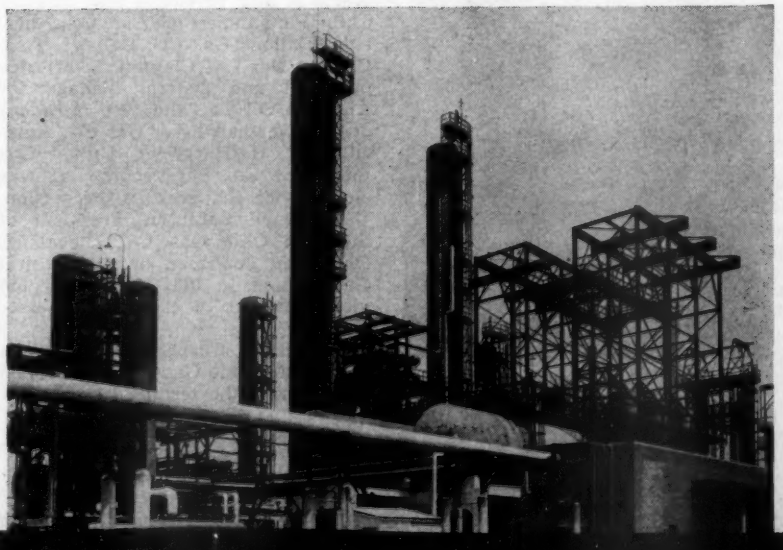
One of the features of the refinery as it is now constituted is that it is completely self-contained from the standpoint of aviation-gasoline manufacture and it will not require the importation of blending agents from other refineries. This feature is rendered more exceptional by the complete absence of isomerization facilities to produce charging stock for the alkylation unit. Sufficient isobutane is produced in the refinery's catalytic-cracking operations to eliminate the need for a separate unit for its manufacture.

The isobutane thus available will be reacted with butylenes, also available in ample quantity from cracking operations, in the presence of hydrogen fluoride to produce the necessary alkylate. The alkylation unit consists of six reactors which will circulte 300,000 gal. per minute of b-b stock and anhydrous hydrofluoric acid. Since this reaction is exothermic, heat removal is necessary. It is accomplished by circulating water through tubes in the reaction zone. The water is circulated through the heat removal system at the rate of 16,800 gal. per minute. Separation of the acid from the alkylate is effected in two 150-ft. fractionating towers.

As previously mentioned, the high quality of the base stock produced in the retreating operation requires comparatively small quantities of alkylate. The octane rating of the alkylate and its lead susceptibility are normal for this operation. The alkylation unit was laid out in such a manner as to make possible the expansion of its capacity.

The gas-recovery system, which is a part of Plant 15 will collect gas from all gas-producing units in the entire refinery. This gas, together with unstabilized gasoline from the second-pass operation, will be processed in the stabilization unit. Products from this unit include a b-b cut which is used as charging stock for the alkylation unit, a C_3 cut, which will be marketed as industrial fuel and isopentane which is used to impart desired volatility to aviation gasoline. A substantial surplus of isopentane will be produced in the fractionation of gases and this volume will be available for other refineries in need of it.

Hydrofluoric alkylation unit in Sun Oil Co.'s new aviation-gasoline plant at Marcus Hook, Pa., was dedicated October 27. The two towers, each as high as a 15-story building, are deisobutanizers



Natural-Gas Industry Asks for Relief From Income-Tax Anomalies

by H. Stanley Norman

R. E. WERTZ

SHARP criticism was leveled this week at the current interpretations and administration of the corporate income tax law as applied to the natural-gas industry by speakers addressing the annual meeting of the American Gas Association at St. Louis, Mo., October 26-28. The anomalous situation whereby pipeline and producing companies are delivering substantially increased volumes of natural gas but operating at a reduced level of earnings cannot long exist, speakers declared.

Despite the unfavorable tax legislation and the regulations preventing expansion of production and transmission operations in most parts of the country, a generally optimistic long-term outlook for the gas industry prevailed at the meeting.

Burt R. Bay, retiring chairman of the Natural Gas Section and president of the Northern Natural Gas Co., Omaha, Neb., cited the sharp expansion in consumption by industrial concerns and predicted that another rise of at least 10 per cent in demand will occur in 1944. He pointed to the relatively small percentage of the nation's fuel requirements currently served by natural gas as evidence that virtually unlimited opportunities for expansion confront the industry.

The rate of gas-well completions registered so far this year, Mr. Bay reported, indicates that the drilling curve will be not more than two-thirds of normal. Even the drilling rate attained in 1941 would be insufficient to offset the excess of current market requirements, he said. The sharp decline in reservoir pressures even in fields with substantial reserves was cited as confirmation of his thesis that current production rates are excessive when balanced against depressed development and exploratory drilling.

ERNEST R. ACKER

Wertz Elected President

Ralph E. Wertz, president of the Amarillo Gas Co., Amarillo, Tex., was elected chairman of the Natural Gas Section, succeeding Mr. Bay. Mr. Wertz is also president and director of the Panhandle Pipe Line Co., Amarillo; Dalhart Gas Co., Dalhart, Tex., Clayton Gas Co., Clayton, N. M; vice president and general manager of Amarillo Oil Co., and vice president of the Canadian River Gas Co., Amarillo. R. H. Hargrove, United Gas Pipe Line Co., Shreveport, La., was elected vice chairman of the section.

J. French Robinson, president of the East Ohio Gas Co., Cleveland, Ohio, and chairman of the Natural Gas Section, in 1941-42, was elected vice president of the general association.

Charles F. Turner, chief chemist of the East Ohio Gas Co., was elected chairman of the technical section.

Ernest R. Acker, president of the Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y., was doubly honored. He was elected president of the general association and received the Charles A. Munroe award for having made the most outstanding recent contribution toward the advancement of the gas industry.

Highest technical recognition in the industry was conferred on A. V. Smith, consulting engineer of Philadelphia, Pa., who received the Beal medal. Mr. Smith was chosen for his paper on "Cathodic Protection Interference" which he presented at the distribution conference in Cincinnati, Ohio, last April.

Two veterans of the natural-gas industry, Clifton W. Sears of Pasadena, Calif., and Maurice W. Walsh of Detroit, Mich., were elected honorary members of the section, the first men so honored.

J. FRENCH ROBINSON

Engineering Skill Vital In Repressuring Work

(Continued from page 32)

saturation, with few low saturation streaks; an area of not too high connate water. Our eastern regions have a natural advantage of a plentiful water supply. With all of these natural advantages what result did we get at Bradford in the nineteen twenties? A recovery of about one-third of the oil obtainable by our present methods.

Why did we obtain such poor results in the early days? First, because the intakes which provided energy for its flooding action were improperly shot. Again, I cannot urge too strongly proper sand sampling in any form of secondary recovery. The little operator may say that he cannot afford this luxury, but even the poorest operator can afford to drill 1 or 1½-ft. screws, and the information from this, used in shooting, will usually save its cost in well cleaning.

I cannot urge too strongly, that if you are going to repressure use the best engineering skill available, sample the sand in each well, chip or core, depending on the economy of the various methods of sampling in your neighborhood. Use very little glycerin in the high permeability streaks, and shoot the tight sand with all of the glycerin possible.

Availability of World's Oil Supply

by Ernest O. Thompson*

YOU men of the National Stripper Well Association hold the key to the oil situation in America today. Your operating problem is the real problem of the industry from the production standpoint. When we speak of giving needed price relief to the stripper well operator we really include all producing oil wells because the flush wells of today will soon be strippers at the present rate of oil production in America.

Those in high authority in Washington, those men from the industry upon whom the Government depends for final information—the Petroleum Industry War Council—say that we will be 500,000 bbl. of oil short each day during the third quarter of 1944, even with strict rationing.

We are producing oil at an all-time high of 4,600,000 bbl. per day but even with that huge rate of production the demand is so great that stocks of both oil and products aboveground are gradually going down until they have now just about reached the absolute minimum for safety.

We cannot long maintain this high rate of production here in America without new discoveries.

We need to bring in a new 30 million-barrel oil field every 6 days to keep pace with the rate of withdrawal. We are not doing it.

We know we are going to need the oil but as yet all efforts to get a price increase have failed. Oil producers are denied a fair price on which to hunt on their own account for new oil fields to keep the wartime economy going.

If the oil industry were allowed to earn the 8.4 per cent permitted other industries we could have the requested 35-cent-a-barrel increase and I firmly believe there would be a 50 per cent increase in drilling as an immediate result.

In California where they got a 35-cent-a-barrel raise there was an immediate increase in drilling of 52 per cent.

The petroleum industry is struggling to maintain itself while its base stock, crude oil, is bringing only 77 per cent of the 1916-1920 price and only 76 per cent of the 1921-1925 price. Its a pretty rocky road to travel.

The people hurt most of all in this cruel process are the operators of stripper wells.

The stripper well operator cannot increase the production of his well without spending money on secondary-recovery methods and he cannot spend the money if he does not have it and sees no prospect of being able to make the money from his profits.

He sees his costs constantly increasing with a frozen selling price—frozen at a level far below other commodities.

In Texas alone there is 136 million barrels of empty steel storage today.

The situation has been getting constantly worse for 2 years.

I cannot believe that anybody in the Government wants the independent operators and the stripper well operators pushed out of the oil-producing picture. But every delay hurts these people who in the past have found most of the new oil fields in the United States.

It might surprise some of you to look at the map showing ocean routes and distances and find that the haul from Aruba to New York is 1,716 miles while the distance from Houston, Tex., to New York is 1,910 miles.

After all, the users of crude and products of crude oil do not particularly care where it comes from just so its available in ample quantities.

In Bahrein, Egypt, India, Iran, Iraq, Saudi Arabia, Trinidad and the United Kingdom, there is a present known potential of 845,000 bbl. per day with current production of about one-half of that amount, leaving there some 422,000 bbl. of oil per day that can be obtained from those countries. You may be surprised to know that in England there is 2,700 bbl. per day production.

The world oil reserves as of 1942 were 54,882,600,000 bbl. The world production as of 1938 was 2,440,880,000 bbl. or 3.7 per cent.

Included in these reserves are 20 million barrels for the United States and our 1938 production expressed in per cent against our reserves was 6.3 per cent. We all know that our production has greatly increased since 1938 and our problem gets more serious in proportion as our percentage of production increases as compared with reserves.

It is reported that the Japs have reconditioned and redrilled wells taken from the Dutch but we are fast closing in on their transportation lines on the sea, and it will do them little good to have oil they cannot move.

Foreign Field Development

Steps are now being taken by Government to develop foreign oil properties owned by American companies.

Directives have been issued by the petroleum administrator to do all things necessary to produce, refine and transport oil at places closer to our fighting armies and fleets.

So it can easily be said that perhaps the wisest logistic move yet made is to make oil and gasoline readily available to our fighting forces close to the oil-producing source where it can be transported to the fleet, and the land and air forces without the dangers and risks of loss through sinkings in a submarine-menaced Atlantic.

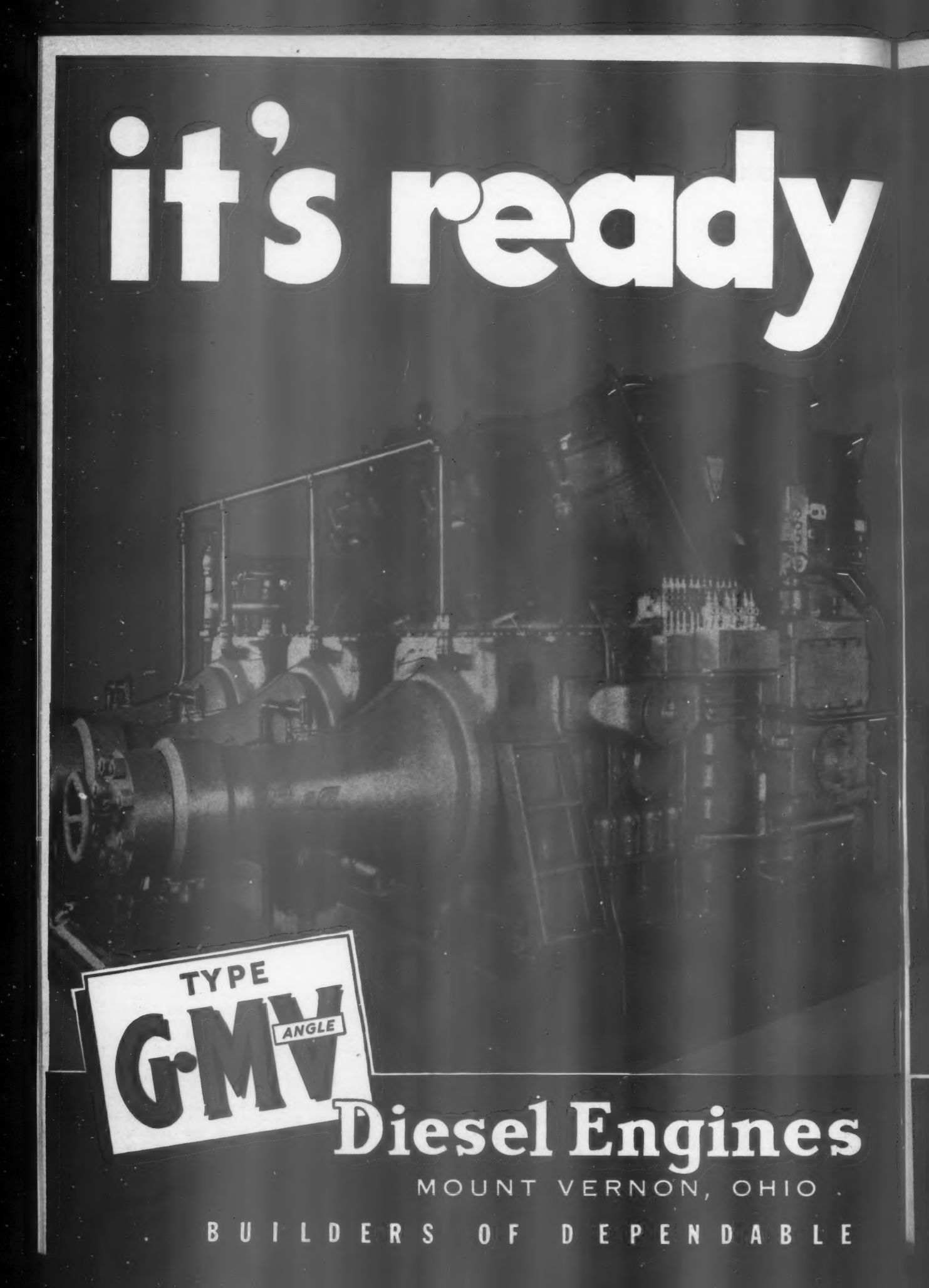
The wartime necessity for this far-reaching move on the part of our Government not only helps to assure final victory in this war but the development of these oil reserves in the Near East will bring to peacetime usefulness, a new oil reserve almost equal to the reserves of those now known in the United States.

The Government in wartime can do all this job quicker than the companies owning the properties could ever hope to do it.

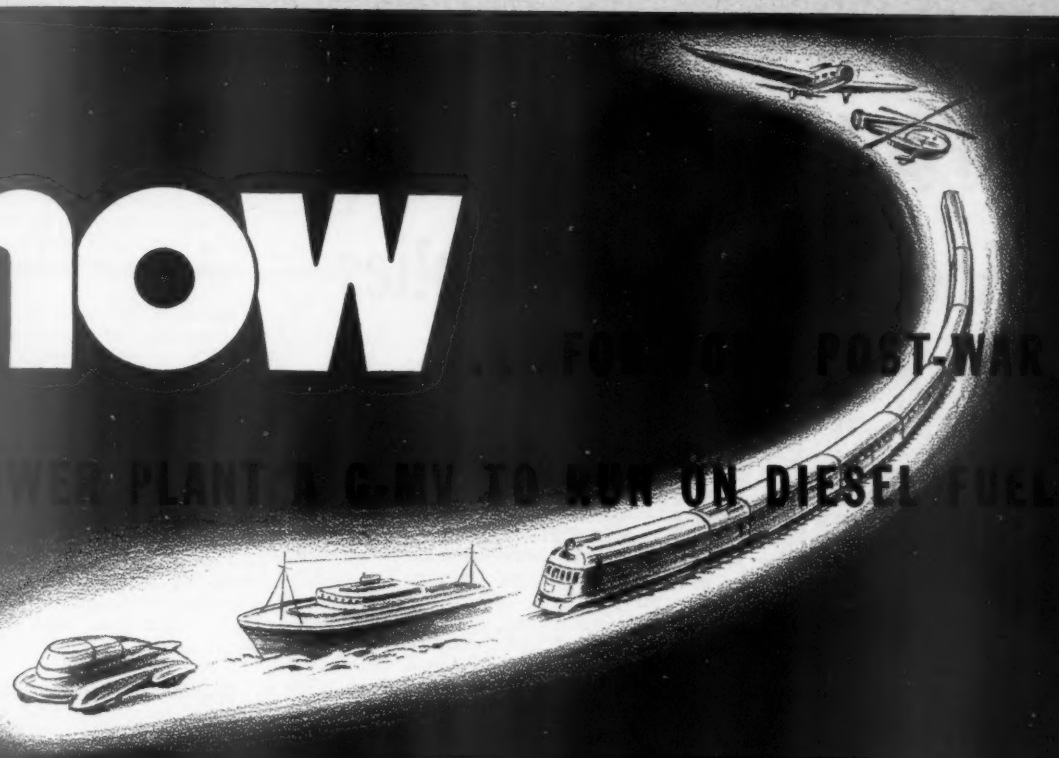
It cannot be completed too quickly. The speed shown in this effort and the success of those efforts will help to shorten the war and to assure final victory.

Then when the war is done, America will have just that much more oil available for the world-wide commerce that will come with a free air, free seas and freedom of enterprise.

*Texas railroad commissioner.


it's ready
TYPE
GMV
ANGLE
Diesel Engines
MOUNT VERNON, OHIO
BUILDERS OF DEPENDABLE

now



TO DRIVE compressor cylinders . . . generators . . . pumping equipment . . . the G-MV has long since proved itself to be an efficient and economical gas engine.

Now, G-MV is available as a Diesel. Its rugged construction is the same. Its many unique features, responsible for an always outstanding performance, are unchanged. Each power cylinder still develops well in excess of 100 h. p. The only difference is that you run it . . . at full efficiency, with equal economy . . . on fuel oil.

All G-MV's shipped now are completely flexible as to fuel. Only two simple, easy-to-make changes are needed to convert from Diesel to gas, or from gas to Diesel.

You'll want this modern G-MV — Diesel or gas — in your Post-war Power Plant. AND REMEMBER — It's ready now! You don't have to wait until after the war to enjoy this latest advantage of complete fuel flexibility in a Cooper-Bessemer.

by **Cooper-Bessemer**

GROVE CITY, PENNA.

ENGINES FOR 110 YEARS

W.P.R.A. Studies Sour Oils And New Crude Supplies

by Arch L. Foster

WICHITA, Kans.—Faced by an increasingly serious crude shortage, refiners of the Kansas section of the Western Petroleum Refiners Association studied methods for refining sour West Texas (Slaughter) crudes at Wichita October 19. This study and discussion is the continuance of earlier meetings held at Shreveport and Tulsa in an effort to inform refiners of District 2, operating heretofore on sweet crudes, of the hazards in handling sour oils, and methods by which these West Texas crudes may be refined successfully.

The principal paper was presented by B. J. Flock, manager of cracking, and F. C. Moriarty, both of Universal Oil Products Co., the paper published in The Oil and Gas Journal of October 14, 1943, page 43, by H. H. Wenzke of the Universal staff, included the main features of the Wichita paper. Properties and sulfur contents of sour crudes were discussed by Boyd Guthrie, Bureau of Mines petroleum chemist, of Bartlesville, Okla.

Discussion of the paper and conversations heard after the meeting indicate that Mid-Continent refiners who do not have sufficient controlled production or an iron-clad contract for sweet crude are seriously studying the problem of how to eke out their requirements by mixing sour crude with their presently available stock. And in this situation the paramount question asked during the meeting is "how much sour crude may be mixed with Oklahoma or Kansas sweet crude, without serious damage or corrosion losses to refinery equipment such as is being operated by the typical Mid-Continent refiner?" It has been calculated that 10 to 15 per cent of sour crude can probably be mixed with sweet crude of the Mid-Continent type, although not enough experience has been had to confirm this belief with certainty. A consensus of refiners is that if and when West Texas or other sour crude is made available to them in District 2 they will attempt to handle it in this way, in order to meet the requirements of the expanded throughput plan of PAW.

It was explained that little or no corrosion is experienced in the topping section of the refinery, the cracking unit sustaining the brunt of this damage. One operator reported knowledge of some degree of corrosion in the radiant section of a crude heater but was not certain if this could be traced to sulfur, or to salt suspended in the crude. Tubes in this heater were reported to be 4-6 chrome steel. Stainless steel—11-13 per cent chromium—was recommended for pump housings, linings, etc., while for impellers, 18 per cent chrome, 8 per cent nickel, so-called 18-8 alloy, was stated to be required. Members in touch with Washington stated that priorities are "loosening up" on alloy steels, one man reporting that it is easier to obtain alloy steels than plain carbon steels because of the change in war-program requirements.

When operating a codimer polymerizing unit on light vapors from sour crudes an H_2S removing process which regenerates its catalyst should be used for best results and most economical operation, it was brought out by the discussion. Any distillate should be caustic-washed before going to storage or for further treating. Ganister (gunite) linings for towers and other equipment operated at low or medium temperatures are satisfactory but must be renewed at about 2-year intervals. No member present knew of anyone now making kerosene from Slaughter crude, which was discussed in the paper. Kerosene distillate must be treated heavily with sulfuric acid, or with desulfurizing catalysts or both in order to remove the objectionable compounds which make it totally unfit for use especially for illuminating oil unless these products are removed.

Refiners observed that if a maximum of 15 per cent is blended with the current crude run, 50,000 bbl. per day of additional crude will be processed to relieve the constantly tightening pinch for refined products, especially for civilian consumption. A 10 per cent blend will use 33,400 bbl. per day. It is not anticipated that each refiner will be able to use this large percentage of sour crude.

DEATHS

T. Karl Simmons, 60, Tulsa oil man, died October 26 in a Fort Worth, Tex., hospital. He had gone to Fort Worth on business when he was stricken with the ailment that proved fatal. Mr. Simmons had been a wildcat operator for 30 years, operating in Texas, Oklahoma and Kansas.

Olin Hickok, 78, veteran oil man and one of the veteran drillers in the Glenn Pool, died last week in Tulsa, where he had resided since 1905.

Rufus M. Ramsey, 54, for 25 years an employe of Arkansas Louisiana Gas Co., died last week in his home in Pittsburg, Tex., where he had resided 13 years.

V. M. Vanderburg, who managed the Gant oil properties north of Bellevue, died last week at the home of his parents in Weatherford, Okla.

J. P. Hamilton, 51, employed more than 20 years in the accounting department of Stanolind Pipe Line Co., Tulsa, died there last week from a heart attack.

Daniel M. Sachs, president of National Transit Co. and chairman of the board of National Transit Pump & Machine Co., died in Oil City, Pa., October 23. Mr. Sachs was born in Hazleton, Pa., graduated from Lehigh University in 1902 with a degree in mechanical engineering and was employed for the next 2 years by Bethlehem Steel Corp. In 1904 he became assistant to the chief engineer of New York Transit Co., with headquarters in Passaic, N. J., later becoming chief engineer. With dissolution of Standard Oil Co. in 1911, he went to Oil City as superintendent of Northern Pipe Line Co., advancing to vice president and general manager. In 1917 Mr. Sachs became general manager of New York Transit Co., with headquarters in Binghamton, N. Y., and later was made president and general manager. He returned to Oil City in 1931 as president of National Transit Co.

Vern Dumas, 67, pioneer oil man of southern California, died suddenly of a heart attack while taking a walk near MacArthur Park, Los Angeles, Calif., his home. Mr. Dumas, active in development of the Santa Fe and Signal Hill oil fields, was one of the organizers of Apex Petroleum Co. and served as its president and general manager. After selling his holdings in that company he was president and general manager of Empire Petroleum Co. Later he filled similar positions in Tal-Mex Oil & Refining Co. and Pan-Mex Petroleum Co. He was identified also with Red Hill Petroleum Co. and Greater Amarillo Oil Co.

Price W. Linden, 49, retired oil man, of Tulsa, died October 24. Mr. Linden was a veteran of World War I, and the American Legion post of Stillwater, Okla., conducted the burial service.

Butadiene Production Under Way at Southern California Gas Co. Plant

*by H. L. Masser**

THE butadiene plant constructed by the Southern California Gas Co. in California is a thermal cracking unit, using remodeled oil-gas generators and accessory equipment, which fitted largely into the general arrangement required for cracking naphtha-feed stock into gas containing light oils and butadiene vapors, with a yield of the latter of about 3.5 per cent by weight of feed stock charged. The plant will charge approximately 21,000 bbl. per day gross of naphtha and produce about 35,000 short tons per year of butadiene. Of this amount of feed stock, about 2,000 bbl. daily will be recycled C_5 + gasoline from the butadiene absorption plant. Essentially the construction of the project may be divided into two parts: (a) the remodeling of Southern California Gas Co.'s gas-generating plant with the addition of equipment as necessary for the production of gas containing butadiene and recovery of light oils and (b) the construction of an absorption unit to treat compressed gas from the manufacturing plant and extract crude butadiene-butylene mixture. The remodeling of the gas works was handled by Southern California Gas Co. and Parkhill-Wade, while the construction of the absorption plant was done in its entirety by C. F. Braun Co.

This thermal-cracking installation will produce 35,000 short tons per year of butadiene by cracking 21,000 bbl. per day of naphtha including recycle stock. Naphtha charge is cracked in checkerbrick ovens along with steam in a 1:1 weight ratio at about 1,350° F. and 1 second contact time. Yield will be about 3.5 per cent.

The gas works, comprising a complete generating unit with all accessory equipment, has a normal capacity of 48,000,000 cu. ft. per day of 1,000 B.t.u. gas made from diesel oil. When operating to capacity with the recently completed alterations and using naphtha feed stock in the amount of 21,000 bbl. per day, there will be a gross production of about 58,000,000 cu. ft. per day of gas from the generators. After removal of tar and oils, there will be a residual volume of gas estimated at 53,000,000 cu.

*Vice president and executive engineer, Southern California Gas Co.

TABLE NO. 1—OPERATING MATERIAL QUANTITIES

	M.c.f. per day	Gal. per day	Bbl. per day	Tons per day	Tons per year at 365 days
Naphtha feed stock:					
Total gross		882,000	21,000	2,867	1,003,275
Pounds per day, 5,733,000.					
Fuel requirements:					
Heat generators	17,700 or	.....	3,100	....	.....
Boilers (total capacity 500,000 lb. steam per hour)	14,553 or	.....	2,555	....	.....
Superheater (360,000 lb. per hour at 700° F.)	1,790 or	.....	314	....	.....
Two 60-lb. compressors (steam fuel)	2,722 or	.....	478	....	.....
Absorption plant steam requirements	*39,307	.....	†6,894	....	.....
TOTAL FUEL REQUIRED					
Gas produced:					
Gross, at washbox outlet at 184° F.	57,900	.....	.....	....	.....
Gross, at water scrubber outlet at 90° F.	53,600	.....	.....	....	.....
Gross, at oil scrubber outlet at 90° F.	53,300	.....	.....	....	.....
At absorption plant discharge (C_3 and lighter, 1,100 + B.t.u.)	48,300	.....	.....	....	.....
Liquid products from gas generating plant:					
Wet tar and oil emulsion from tar sump	.....	168,000	4,000	....	.....
Wet oil and emulsion from water scrubber	.....	95,802	2,281	....	.....
Oil from scrubber oil stripper	.....	90,720	2,160	....	.....
TOTAL OIL AND EMULSION		354,522	8,441	....	.....
Final products—light oils to refinery	.....	189,000	4,500	....	.....
—tar and heavy oil for fuel	.....	102,522	2,441	....	.....
Liquid products from absorption plant:					
C_4B-B fraction	.....	95,760	2,280	244	85,400
Butadiene 46.6 per cent at 5 lb. per gal.	.....	40,000	952	100	35,000
Isobutylenes	.....	30,180	710	76.5	26,775
Normal butylenes	.....	26,480	618	67.5	23,625
C_5 + gasoline	.....	84,000	2,000	....	.....

*1,100 B.t.u. gas. †Fuel oil.

ft. per day which will be delivered to the absorption plant for the extraction of the C_4 fractions and C_5 + gasoline. This company's plant consists of 10 gas generators, 27 ft. diameter by 42 ft. high, with wash-box seals, water and oil scrubbing towers, large circulating pumps for condensing and scrubbing water, fuel and fire pumps. There is also an existing boiler plant having a total capacity of about 300,000 lb. of steam per hour at 150 lb. pressure. Existing tankage for oil amounts in total to about 220,000,000 bbl. The gas produced by the 10 generators is delivered from the scrubbers to a 1,000,000 cu. ft. relief holder, thence by centrifugal exhausters through oxide purifier boxes to remove hydrogen sulfide and delivered into a 6,000,000-cu. ft. storage holder. From the storage holder, gas is drawn by two 1,000,000-cu. ft. per hour steam-driven compressor units and pumped at 60 lb. gage into a 50-ft. diameter Hortonsphere which has been erected at the absorption plant. Existing equipment at the gas works used in this project has a value of approximately $6,250,000. To provide for butadiene operations there was added to the plant:

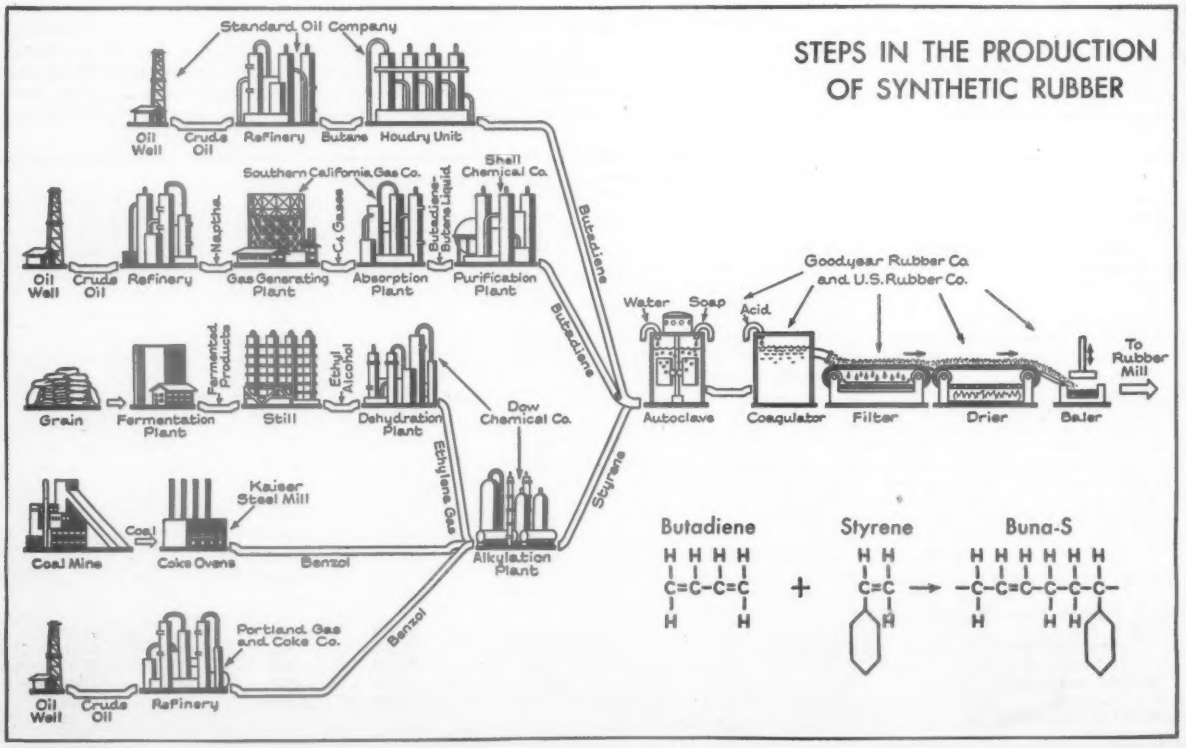
Three 70,000 lb. per hour boilers; one 360,000 lb. per hour superheater to raise the temperature of steam entering the cracking chambers of the gas generators to 700 degrees F.; two 11,000 gal. per min.-circulating water pumps; cooling towers; miscellaneous large pumping units for fuel, feed stock, etc.; new checker-bricking of gas generators to provide for downward heating; ten 48-in. brick-lined hot valves; naphtha feed stock heaters using waste flue gas from generators and concrete chimneys for draft; new tar-light oil separator; oil stripper unit; tar-light oil dehydrator to handle about 8,000 bbl. per day; two 37,500-bbl. steel tanks for temporary storage of recovered light oils; extensive additions to plant piping and electric systems.

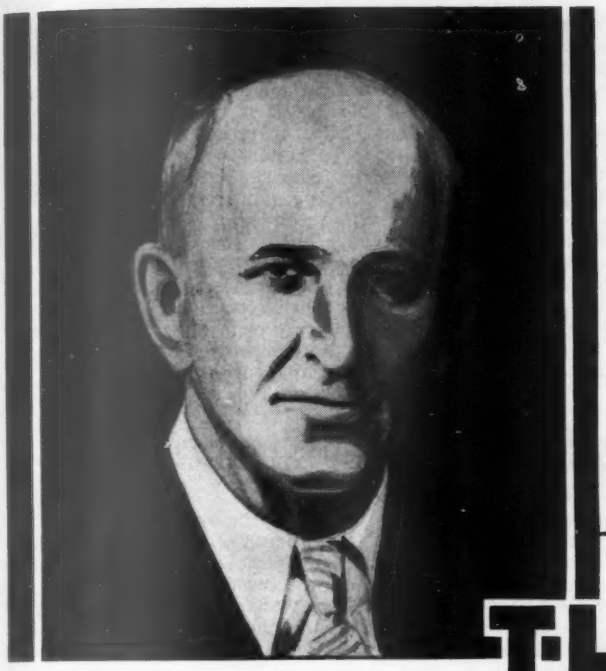
The absorption plant which was designed and construted by C. F. Braun Co. is located on lands purchased by the Defense Plant Corp. This absorption plant draws gas at 60 lb. initial pressure from the Hortonsphere to gas engine direct-driven angle-type compressors at 4,800 hp. total capacity and discharging at 200-lb. pressure. From these compressors the gas flows through the several scrubbing towers and fractionating columns.

Cost of Project

The estimated cost of the new equipment for the project, including the absorption plant, is $5,750,000. General requirements for a high yield of butadiene from the thermal cracking of hydrocarbon oils involves: Heating the oil to the cracking temperature as rapidly and for as short a duration as possible, in an atmosphere of inert gas which serves as both a diluent to accomplish rapid movement through the cracking chamber and a protective medium to retard decomposition or polymerization of the butadiene after formation; and cooling the gas as soon as it leaves the cracking chamber to a temperature at which no further reaction can take place. Maximum yield of butadiene is obtained from the proper combination of pressure, time and temperature. If two of the cracking conditions are fixed by physical details of the equipment, for instance, pressure and time, a corresponding optimum temperature will be found at which the volume of gas produced, and volume percentage of butadiene in the gas, will result in the maximum quantity of butadiene in terms of oil charging stock. In the operation of this plant naphtha of approximately 200° to 500° F., boiling range is cracked in fire-brick checkerboard in an atmosphere of steam, the ratio of oil to steam being 1:1 by weight, or approximately 85 mol per cent steam. The cracking conditions will be approximately 2 lb. per sq. in gage pressure, 1 second contact or residence time, and 1,350° F. The steam performs the functions of the inert gas as already discussed. Immediately after leaving the generator the gas is cooled by water quench. This operation results in a wet gas (up to and including C_5 + compounds, at atmospheric temperature and pressure) equivalent to approximately 9.5 cu. ft. per lb. or 60 weight per cent of naphtha charged, which wet gas contains about 2.7 volume per cent butadiene representing about 3.5 weight per cent of naphtha.

The gas generators, as remodeled from their former design of straight-shot, up-fire, down-make oil-gas machines, have the following internal





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arrangement, from the top to bottom: heating chamber for oil or gas firing; superheater checkerbrick section supported on arch; charging or make chamber; cracking checkerbrick section supported by piers from bottom of generator; gas offtake to washbox; flue offtake through naphtha preheater to stack. There is one naphtha preheater and stack to each two generators with one generator heating while the other is making gas. On the heat portion of the cycle, fuel and air will be introduced into the top of the generator and the hot combustion products will pass down and out of the flue intake, heating the superheater section to approximately 2,000° F. and the cracking section to 1,350-1,400° F. On the make portion of the cycle, steam at 700° F. (400° F. superheat) will be injected above the superheating section, and naphtha vapor at 700° F., (from the naphtha preheater) introduced between the superheater and cracking sections; the steam coming down through the superheater checkerwork will mix with the naphtha vapor, the mixture traveling down through the cracking checkerwork and out of the gas offtake to a water quench. The cycle for any one generator will be of the order of 7 minutes heat, 6 minutes make, and 2 minutes purging and valve manipulation, or a total of 15 minutes. The above operations, and the design of the generators, are based on an extensive series of plant-scale pilot-generator operations which were in progress for several months, using a 20 by 38-ft. generator and regular gas-plant equipment. The internal brickwork of the generator was rearranged several times before the final arrangement was developed.

Table 1 summarizes operating material quantities as estimated. Table 2 gives the composition of the wet gas to the absorption plant.

Naphtha feed stock is delivered direct to the gas works by a series of interconnected pipe lines belonging to several companies. This complex pipe-line system has been worked out with the cooperation of various oil companies and practically avoids the construction of any new pipe lines and obviates the necessity of hauling gasoline by tank cars or trucks which is impractical because of the large quantities involved. Likewise, the recovered light oils will be delivered out of the plant by a similar series of inter-connected oil company pipe lines. The crude C_4 fraction will be piped out from the absorption plant to the Shell Chemical Co.'s purification plant. Two-thirds of the length of this line will be rented from an oil company and the balance was constructed new. Selection of Southern California Gas Co.'s plant for the production of quick butadiene was based primarily upon the existence of large amounts of apparatus required for the process (approximately $6,250,000), with the consequent savings in the expenditure of new critical materials. This basic principle of saving expenditure of new critical materials has been adhered to as rigidly as possible throughout the entire plant construction. Used refinery equipment, such as fractionating columns, pressure vessels and tankage has been utilized wherever possible. Chimneys, feed stock heaters and large water lines were constructed of concrete rather than steel. There were no new buildings, other than a compressor house, involved in this entire project.

TABLE NO. 2

Composition of Wet Gas to Absorption Plant

		Mol per cent
Carbon dioxide	CO_2	0.4
Nitrogen	N_2	0.7
Hydrogen	H_2	19.0
Carbon monoxide	CO	0.9
Methane	CH_4	32.4
Ethylene	C_2H_4	24.5
Ethane	C_2H_6	3.1
Propylene	C_3H_6	10.9
1:3 butadiene	C_4H_6	2.7
Isobutene	C_4H_8	1.7
n-Butene	C_4H_8	1.5
Butanes	C_4H_{10}	0.1
C_4 acetylenes	.....	0.2
C_5+	.....	1.9

Jenkins Stills Become Steam Boilers

UNDER the aging effect of cracking technological progress, Kanotex Refining Co. found itself in possession of three Jenkins cracking stills which were in excellent mechanical condition, superseded in refinery operations by the modern Donnelly cracker then and now operating in that plant at Arkansas City, Kans. What to do with them was a quandary. Some refiners have converted them to storage tanks, accumulators, topping stills, preheaters and to scrap steel.

Coincidentally, Kanotex needed some additional steam capacity; steam boilers were critical equipment, unpurchasable except under high priority ratings, which the company's purpose possibly did not warrant. A collision of these two ideas caused the company engineers to remove stirring motor and propellers, installed in the stills when new to circulate charge through the heater tubes; plug the stuffing-box opening where the stirrer shaft had entered the shell which was of steel more than an inch thick; equip the burners with remote firing control; install Copes feed water regulators, liquid level recording units in the main drums and steam flow recorders. The entire unit—two still-boilers—is operated by remote control with these devices. Each still-boiler turns out about 750 b.h.p, with, of course, a very wide margin of safety, because of the heavy plate and tubes employed in the original construction.

One reason why they may be operated by remote control is that three large drums in each still give immense water storage capacity, with little likelihood that the boiler might run dry quickly. Whereas a modern tubular boiler with small drums may run dry and fail in a few minutes after a feed pump stops, warning signals on these Jenkins still-boilers can notify the distant operator of impending danger long before the danger becomes imminent. The main drum in these stills is 6 ft. in diameter by 30 ft. long; the two cross-drums, into which the heater tubes are connected are each 6 ft. in diameter by 15 ft. long, giving a total capacity of about 1,700 cu. ft. or about 12,800 gallons, an immense storage capacity even if steam separator space in the upper part of the main drum reduces the figures to 8,000-10,000 gallons actually in the still at any given moment. The units are operated normally at 125 lb. pressure.

The still was built originally for what was then considered high cracking pressure (300 lb.); its drum walls are 2 in. thick. Needing stripping capacity, this still was connected to the crude still and is used as a reboiler on the bottoms from the crude flash tower, the topped crude from which is processed further in the cracking stills.

Two Jenkins stills turn out 750 boiler horsepower each of steam

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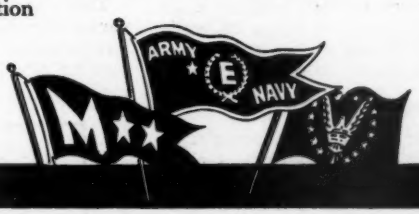

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Plastic Plugbacks in East Texas

by J. E. Bailey and Charles E. Dimit *

A number of generalizations have been made by writers on the future of plastics in industry. The accompanying article discusses one specific application of such materials in oil wells which has been very successful to date. More important, the success obtained so far implies its wider use in completion and recompletion work. The paper was delivered before the 1943 fall meeting of the East Texas chapter of the American Petroleum Institute.

IN the East Texas field, due to state and federal regulations, the per well allowable has been increased on many wells involving a number of leases where salt water is being introduced with the oil.

The increase in per-well allowable on leases making salt water is brought about by the following regulations: (a) Limiting of artificial lift equipment to one well to 10 acres. (b) Transfer of allowables from large volume water wells. (c) Earned salt-water allowables.

The increased allowables under these circumstances have caused an increase in the water production from those remaining producing wells.

Operators with leases in this category are continually adjusting their operations and venturing remedial work in an attempt to obtain the maximum ultimate recovery from their respective leases.

Several papers have been given on methods and results of plugging back with cement, during the life of the East Texas field. The five principal methods recognized with the use of cement are as follows:

1. Dump bailer.
2. Displacement.
3. Bradenhead squeeze.
4. Short-string squeeze.
5. Retainer squeeze.

Consensus of opinion, on cement plug-back jobs, is that more successful jobs on thin sand sections are obtained where there is a shale break between the oil and water-bearing sands.

Since November 1942, plastics have been used to plug off water in wells in the East Texas field, using only the dump bailer method.

Properties of Plastic

The plastic which is now being used is similar to bakelite and is a clear amber liquid containing no undissolved or suspended particles. This particular plastic has the property of changing from a liquid into a solid by the application of heat. The higher the temperature, the faster this particular plastic changes into a solid and conversely, the lower the temperature the slower is the transformation. The East Texas field has a bottom-hole temperature in the neighborhood of 145° F. at which temperature this plastic solidifies in approximately 12 hours. Because of the comparatively few jobs outside of the East Texas field it cannot be definitely said how long it will require for this hardening process to take place in wells of different bottom-hole temperatures.

*Tide Water Associated Oil Co., Kilgore, Tex.

It has been noted that the setting time of a small sample in the laboratory at a particular temperature, is less than a larger volume of plastic placed in a well. This difference is believed to be due to the low conductivity of heat of the plastic. Following is a tabulation of setting times with corresponding temperature obtained in laboratory tests.

Temperature (°F.)	Setting time (hours)
135	30
145	12
150	10
165	6
195	1

The liquid has a specific gravity of 1.2 at 60° F. and weighs approximately 10 lb. per gal.

The viscosity of the liquid plastic varies somewhat, depending upon the temperature, however, at temperature of 60° F. it usually has a viscosity of approximately 200 centipoises or a viscosity comparable to that of S.A.E. No. 30 motor fuel.

One of the most important properties of the liquid plastic is its ability to penetrate the formation. It has been found in the laboratory that at a temperature of 145° F. the plastic can be forced through Woodbine cores (1 in. in length by 1 in. in diameter) with about the same ease as crude oil. The rate of flow at various pressures has not been determined at this time. In the field, oftentimes 100 per cent penetration of the fluid into the formation has been obtained by filling the hole full of water, giving a 500-lb. differential over bottom-hole pressure, but the average volume penetration has been in the neighborhood of 25 per cent of the volume of plastic used. In many cases Jel-flake has been used to reduce the penetration so that greater fillup of the hole may be obtained.

The solid plastic is an opaque, reddish-brown material which is very similar in appearance to the plastic used in many every-day articles. The tensile strength of 240 lb. per sq. in. and compressive strength of 1,800 lb. per sq. in. are comparable to the strength of cement, as neat cement will vary from 250 to 500 lb. per sq. in. tensile strength, and from 1,000 to 12,000 lb. per sq. in. compressive strength. The ability of the plastic to adhere or bond to steel, cement, and the formation is an equally important characteristic and makes it more suitable for water shutoff than cement which has extremely low bonding strength. The solid plastic is chemically inert and insoluble in crude oil, brine, and other materials commonly found in oil wells. It is therefore a more permanent plug than

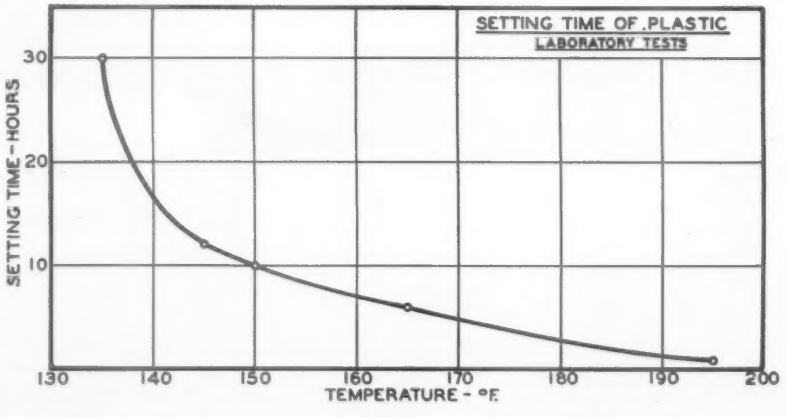

Fig. 1

some cements which have a tendency to soften and dissolve in most oil-field brines.

Plastic Plugging Method

Equipment.—The automotive equipment used consists of a small pickup or truck on which is mounted a reel for spooling necessary cable. The reel is driven through a power takeoff from the truck motor.

The plugging equipment consists of lightweight bailer which holds about 10 gal. A special dump valve is installed on the bottom of a tail pipe. Inside the bailer is a piston which provides positive displacement of all plugging material. A meter is used on the wire line for accurate measurements of depth while running in, dumping, and removing the bailer from the hole.

Procedure.—Most operators possessing knowledge of top of sand, total depth and size of hole to be plugged give instructions as to desired plugged-back total depth. The service company proceeds to dump liquid resin on bottom in sufficient quantities to obtain desired fill up. After each dump of resin on bottom and an elapse of time for hardening, the total depth is checked for fillup. If the desired fillup is not obtained, the procedure is repeated. Penetration of the plastic into the formation may be partially controlled by application of additional pressure at the surface.

Costs.—At the present time a minimum price of about $300 has been established for plugging services, which includes supplying 30 gal. of plastic, if needed.

Charges for electrical log, tubing crews and material vary as desired by individual operators, but the total charges for a complete job should run in the neighborhood of $600 to $1,000. These costs are to be compared to costs of different types of cement jobs of $500 to $3,000, depending upon type used. It is generally conceded that the average plastic plug job is considerably cheaper than the average bradenhead squeeze or retainer squeeze (the two most successful types of cementing jobs in East Texas).

Results.—As of September 1, 1943, 132 plastic plugging jobs had been performed within a 200-mile radius of the East Texas field. Of this number 108 jobs have been completed in the East Texas field proper and 24 in outlying fields. Accompanying is a tabulation of the results of these 108 jobs performed from November 1, 1942, to September 1, 1943.

In preparing Table 2 available data on cementing were taken from paper written by R. H. Maples and F. J. Mikeska, "Plug-Back Work in the East Texas Field." Data as to the success of plastic plugging was obtained from records of the plugging company and represents data on all wells plugged with plastic to September 1, 1943. In classifying these plugback jobs as successful and unsuccessful, the plugback was considered to be successful where the water percentage was reduced 50 per cent or more, and unsuccessful where the water was not reduced as much as 50 per cent.

It cannot be overemphasized that the success of all plugback jobs depends upon the completeness of the information available on individual wells, such as the effect past production practices have had on the location of water cones, water encroachment rate, and present water percentage. In several instances operators have had 100 per cent success in shutting off water with 7 ft. of sand exposed, with no protective shale breaks, by plugging off all but 1 ft. Success of these marginal jobs is attributed to the penetration and bonding qualities of the plastic, characteristics not so prevalent in cement plugback jobs.

Detailed information is available on only 12 plastic plugback jobs performed on wells having from 3 to 7 ft. of exposed sand section. Of these 12 jobs, 7 were successful, 3 partially successful and 2 were failures. Of 19 wells plugged with 3 to 10 ft. of exposed sand section there were 11 successful jobs, 5 partially successful and 3 failures. Of 32 plastic jobs with from 3 to 15 ft. of sand section 22 were successful, 7 partially successful and 3 failures.

Twelve plastic jobs were performed on top of cement plug failures. Of these 12 jobs, 8 were successful, 3 partially successful and 1 failure. There were 4 jobs attempted through liners in the hole, 3 of which were successful and the results of the fourth job are not available.

In no sense should cement plugback jobs be relegated to unimportance as the necessity for the use of cement has not been overcome. Wells with great penetrations and large holes are deemed expensive in attempting to plug back with the plastics now available.

Reservoir Conditions

During the past 5 years the reservoir pressure in the East Texas field has dropped approximately 100 lb. per sq. in. In areas where remedial work is being performed the reservoir pressure is about 1,000 lb. or less. In using fresh water as a circulating fluid the pressure exerted by the water is about 560 lb. in excess of the reservoir pressure. In using dead East Texas oil to kill the well, the oil exerts a pressure of about 190 lb. in excess of the reservoir pressure and prevents water contamination of oil-bearing zones. With present reservoir pressures in the East Texas field, minimizing the contamination with water of oil-bearing zones appears to insure a higher percentage of success in plastic plugback jobs.

It is believed that excessive water intrusion results in false interpretation of electrical logs and creates water channels through the oil-producing zone to the water-producing zone, especially in wells without shale streaks in the exposed sand section. This water intrusion may account for some of the failures in cement jobs.

Future of Plastic Plugging

At the present time several plastics are in various stages of development. It is felt that desired setting times can be obtained with resins that will range from 120° to 200° F.; the low range will use a resin that sets in 6 to 12 hours and the upper range, around 200° F., will use a resin that hardens in 2 or 3 hours. Also envisioned for the future is the use of a catalytic setting resin that will provide greater elasticity of operation than the present thermal setting resins.

With the progress made in developing new plastics with entirely different characteristics, new types of selective completions and squeeze jobs may be the next step in use of plastics in oil wells.

Acknowledgment

Special acknowledgment is made to Tide Water Associated Oil Co. for permission to prepare and present this paper.

The assistance of Dowell Incorporated employes, who generously furnished data, is also gratefully acknowledged.

TABLE 1

Location—	No. of jobs	Completely successful	Per cent	Partially successful	Per cent	Not successful	Per cent
East Texas	108	71	66	20	18	17	16

TABLE 2—SUCCESS OF DIFFERENT PLUGGING METHODS

Method—	No. of wells plugged	Successful plugbacks		Per cent successful
		Yes	No	
Plastic	108	86	22	80.0
Squeeze (cement)	55	39	16	70.8
Nonsqueeze (cement)	33	25	8	75.7

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R. H. Maples and F. J. Mikeska: "Plugback Work in the East Texas Field."

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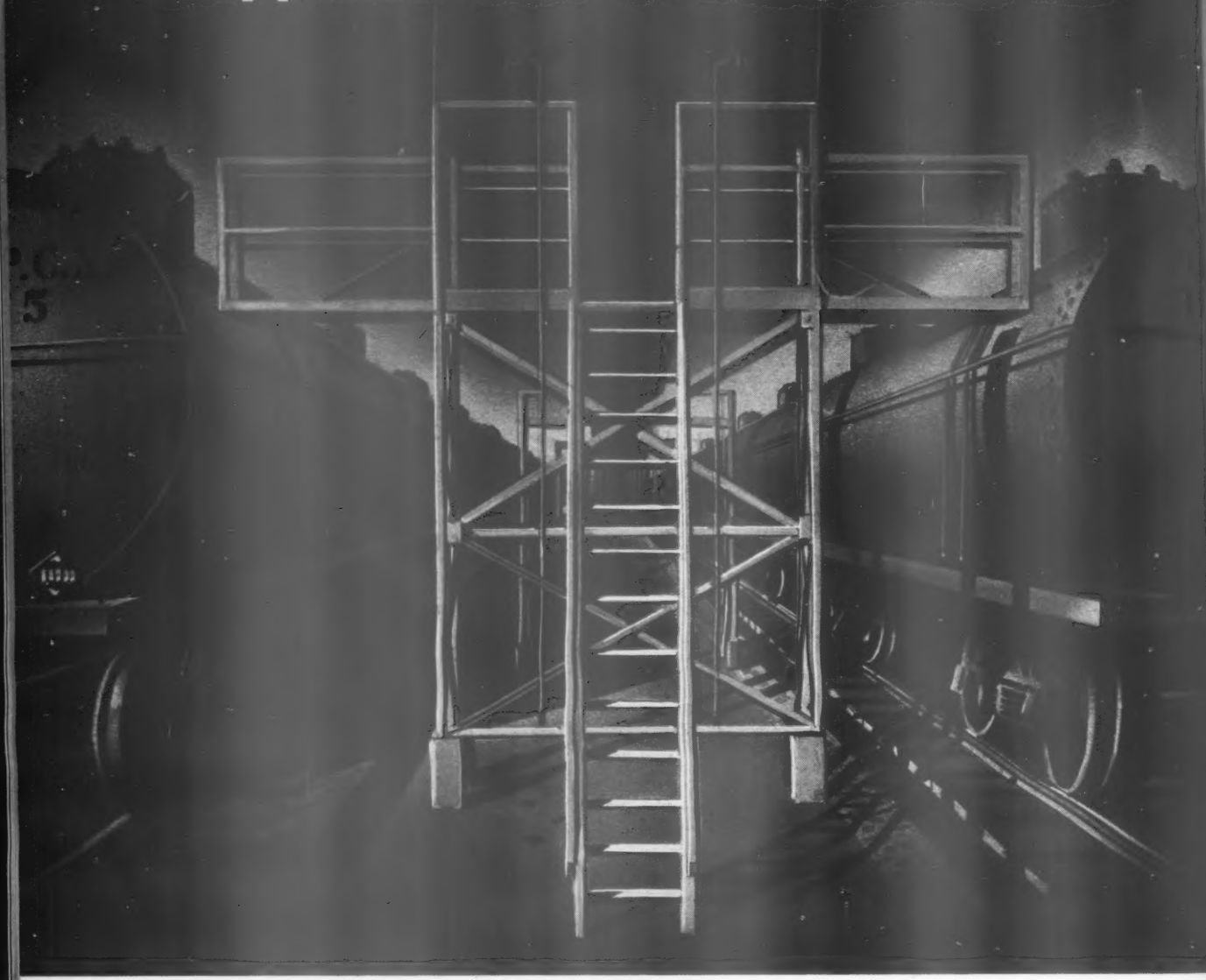
Safety practices around oil refinery loading racks



Information supplied by "Oil and Gas Journal"

These safety precautions will help reduce avoidable accidents around oil refinery loading racks.

1. Rail both sides of walkways and platforms, making necessary openings just large enough for passage.

2. Provide adequate tools designed for safe, efficient use even in restricted spaces. Assign tools to specific racks, or fasten securely at the job.

3. Keep swing line joints lubricated and free-working with ends fitted vapor-tight in manhole covers, or provide special manhole covers if possible when handling volatile liquids, liquefied gases, etc. Fit return vapor lines tightly to manholes when returning light hydro carbons to plant recovery system, or vent them at safe distances.

4. Place "spotter marks" on railroad rails or platforms so semi-fired connections present minimum danger. Mark racks, driveways, etc. to permit safe, accurate spotting of tank trucks.

5. Insist on standard, safe procedures when cleaning cars or truck tanks near loading rack. Keep heating coil, steam, air connections safe, simple, tight, so that cleaning agents can be admitted only when line connection is tight and must be cut off before breaking the connections.

6. Install derails or gates to prevent movement of cars during loading; keep tank truck brakes set during loading and unloading.

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PROGRESS IN METALS

by W. L. Nelson

Scrap Sorting—Nondestructive and Rapid

OBVIOUSLY, numerous methods of identifying metals or alloys of them are possible—probably running to hundreds of methods—but to be really valuable for the purpose of sorting small pieces of scrap, only the most rapid methods can be utilized. It is impossible on this page to describe, or even organize, the numerous methods that may be used, but it is possible to survey the methods most recently described in the current literature.

The importance of saving scrap and properly sorting it is evident to all. Scrap is needed to fight the war, alloy materials are even more scarce than plain steel or iron, and finally, the mixing of alloys, or alloy steel with regular scrap, tends to produce new steel that contains the wrong proportions of alloy elements. Such a steel may exhibit a behavior and properties that are unpredictable.

Classifying steel scrap by spark test. This method is discussed by the International Nickel Co. in "Nickel Steel Topics" of March 1943. The method is described as follows: "Very little equipment is needed: a small portable grinder (or a stationary one will do if the scrap is in easily handled pieces), safety goggles for the operator, and a set of steel samples of known analysis to serve as standards. The lighting conditions are important: strong direct light is a definite disadvantage, but absolute darkness is not necessary. The tests should be made in a shadow, and against a dark background.

"The operator should become accustomed to holding the pieces to be tested against the emery wheel at the same angle and exerting a more or less constant pressure; preferably so that the spark stream is thrown about a foot in length horizontally and at right angles to the line of vision. With practice, under such conditions, it becomes easy for him to recognize the characteristic spark patterns for steels of varying carbon content, and for the presence of alloying elements, particularly tungsten, molybdenum and nickel. High-speed steel is easily identified by this method."

This method, as well as most others, can be applied most successfully if something is known of the kinds of steel that may be encountered.

This method has been applied to a large number of materials, including wrought iron, machine steel, S.A.E. 1015 low-carbon steel, S.A.E. 1095 carbon tool steel, gray cast iron, white cast iron, malleable iron, high-speed steel, manganese steel, stainless steel, tungsten-chromium die steel, nitrided nitralloy, stellite, cemented tungsten carbide, nickel, copper, brass, aluminum, S.A.E. 3130 nickel chromium steel, S.A.E. 4640 nickel molybdenum steel, and S.A.E. 2340 nickel steel (see Fig. 1). The method is described on the Progress in Metals page of The Oil and Gas Journal of May 15, 1941 (p. 61); in a bulletin entitled "Sparks" by the Norton Co. of Worcester, Mass.; by Hildorf & McCallam, Metals Handbook 1939, pp. 773-776; and by L. P. Tarasov in the Iron Age of April 16, 1942.

Electrical methods.—Most electrical methods depend upon the magnetism of iron or the loss in magnetism caused by heating, but one method involving the passage of current through the metal and into a moistened test paper is described by Calamari, Hubata & Roth on Page 71 of the January 15, 1943, issue of the analytical edition of Industrial & En-

QUALITATIVE TESTS FOR IDENTIFYING SOME COMMON WHITE METALS AND ALLOYS

Magnetic test	Nitric acid test					
Reaction to magnet	Reaction to conc. acid	Reaction to acid after dilution	Color of the solution	Iron nail test for copper	Drop test with cupric chloride in hydrochloric acid	Material probably is
Magnetic	Reacts slowly	Reacts slowly	Pale green	No copper plates out	Not required	Nickel
Magnetic* (slightly)	Reacts	Reacts slowly	Greenish blue	Copper plates out	Not required	Monel*
Nonmagnetic	Reacts	Reacts	Bluish green	Copper plates out	Not required	Copper-nickel alloy containing less than 60 per cent Ni, e.g., nickel-silver
Magnetic	Reacts slowly	Reacts	Brown to black	Not required	Not required	Steel or cast iron
Nonmagnetic	Reacts slowly	Reacts	Brown to black	Not required	Not required	"Ni-Resist"
Magnetic	No reaction	No reaction	Colorless	Not required	Not required	Straight chromium stainless steel
Nonmagnetic†	No reaction	No reaction	Colorless	Not required	Copper deposits when drop is diluted	Chromium-nickel stainless steels e.g., "18-8"‡
Nonmagnetic	No reaction	No reaction	Colorless	Not required	No deposition of copper occurs	Inconel

*While monel is usually magnetic at room temperature, it sometimes can appear nonmagnetic. In such cases it usually will become magnetic when dipped in ice water or freezing mixture. Or, if magnetic at room temperature, it becomes nonmagnetic when heated or dipped in boiling water. No other common metal behaves in such fashion within this range of temperatures. "K" monel is always nonmagnetic.

†Normally nonmagnetic, the 18-8 type alloys may sometimes become slightly magnetic as the result of cold-working. The nitric acid test in such cases becomes a more reliable method of identification.

‡In some cases it may be desirable to distinguish between stainless steel of the 18-8 type without added molybdenum from that to which molybdenum has been added. This test is made by immersing the specimen in question in a solution in water of 75 per cent by weight of orthophosphoric acid and 1 to 30 g. per liter of common salt at 140° to 200° F. If molybdenum is not present, bubbles of hydrogen will begin to form within 30 seconds. If molybdenum is present, bubbles will not form.

gineering Chemistry. This method is used for the detection of molybdenum in alloys or steels. The method consists of connecting the unknown metal as an anode, pressing a wad of filter paper moistened with a sodium nitrate solution against the metal and then applying the cathode connection against the paper for 1 to 3 seconds. Molybdenum is detected by treating the wad of paper with two other solutions. The current need be only 0.5-1 amp. and it is stated that the entire test can be completed in a few seconds.

The more common magnetic methods have been discussed on Page 42 of The Oil and Gas Journal of December 24, 1942, and more completely by C. S. Williams in the November issue of Metals & Alloys and Shop Notes (R. H. Grace) section of the May 1942 issue of Metals & Alloys. Williams presents a method by which similar pieces of low and high carbon steel can be distinguished although it is stated that the method can be applied to many kinds of steel. The pieces to be tested are introduced into a magnetic field. Some materials disturb the field more than others. The other method (R. C. Grace) is also used to distinguish between low-carbon and high-carbon steels. After heating the parts and quenching them, the parts were laid across the poles of a magnet for 10 seconds. The high-carbon steel parts retained enough magnetism to be detected by means of their attraction for a piece of soft iron.

Magnetic tests are also involved in the identification of the white metals discussed below.

Spot tests. — Although it would seem that spot tests could be developed for many of the common metals and alloys, not many of them have been described. Tests of this nature for molybdenum are mentioned by F. Feigl in his book "Spot Tests" 1st ed., Nordeman Publishing Co., New York, and by Tananeav and Pachenko, Ukrain. Khem. Zhur (Russian) 4 Sci. Pt.), 121-12 (1929).

A spot test for nickel in steel is described on the Progress in Metals pages of The Oil and Gas Journal of July 2, 1942, and March 12, 1942, and more completely by T. H. Williams (Ind. Eng. Chem., Anal. Ed., Jan. 15, 1942, p. 72) and Nickel Steel Topics (Int. Nickel Co.) March 1942. The International Nickel Co. method consists of applying 1 or 2 drops of 50 per cent nitric acid to the steel. After 30 seconds stir an excess of zinc oxide into the drop and apply a special test paper. A pink stain indicates the presence of nickel. The Williams method is similar and it is suggested that the original references be consulted in conducting either of these tests.

The white metals.—The white metals that are rich in nickel or chromium are particularly valuable. Methods of distinguishing between some of these metals is indicated in the discussion and table given below (from Inco, Summer issue, Vol. 18, No. 4 of Int. Nickel Co.).

There are four simple identification tests which can be carried out with the aid of inexpensive and readily available supplies. These are the magnetic test, the nitric acid test, the test for copper with an iron or steel nail, and a test with the use of cupric chloride solution.

In the magnetic test, the magnet should be brought into contact with the specimen, care having been taken that no magnetic material such as iron or steel is beneath, or in the immediate vicinity of the specimen. The magnet will or will not be attracted to the specimen. When in doubt, and especially where the material seems to be nonmagnetic, a more sensitive method is to balance the magnet, or the specimen, on the edge of a bench or desk and bring the specimen close to the magnet or vice versa. If the material is magnetic the balance will be upset and the movement of either the magnet or the specimen will be observed. Suspension of the magnet on a string, and carrying the specimen up towards it will bring similar results.

In the nitric acid test, the surface of the test piece should be clean to insure direct contact between the acid and the metal. One or two drops of concentrated acid are then applied, and after a minute or two any reaction that takes place can be observed. After this reaction has been noted, the acid should be diluted with 3 or 4 drops of water, 1 drop at a time. Should the solution turn either green or blue, the third, or so-called "nail test," should be used.

A clean iron or steel nail is rubbed in the acid solution on the metal surface, the nail being kept in contact with the specimen. If the alloy contains copper, there will be a deposition of copper either on the nail or on the surface of the metal under the acid solution. Finally, a drop or two of additional water should be added as the nail is rubbed around to prevent the deposited copper from redissolving in the acid.

Chief value of the fourth test is to distinguish Inconel from the 18 per cent chrome-8 per cent nickel type of stainless steel. In this test a drop of cupric chloride in hydrochloric acid should be applied to the cleaned metal surface and allowed to remain for 2 minutes. At the end of this period, 3 or 4 drops of distilled water should be added slowly, 1 drop at a time, to the solution on the metal. The solution may then be washed off.

If the sample is 18-8 stainless steel, the copper in the cupric chloride solution will be deposited on the metal surface, appearing as a copper-colored spot. If the sample is Inconel there will be no deposition of copper. Only a white spot will be left to indicate where the solution was applied.

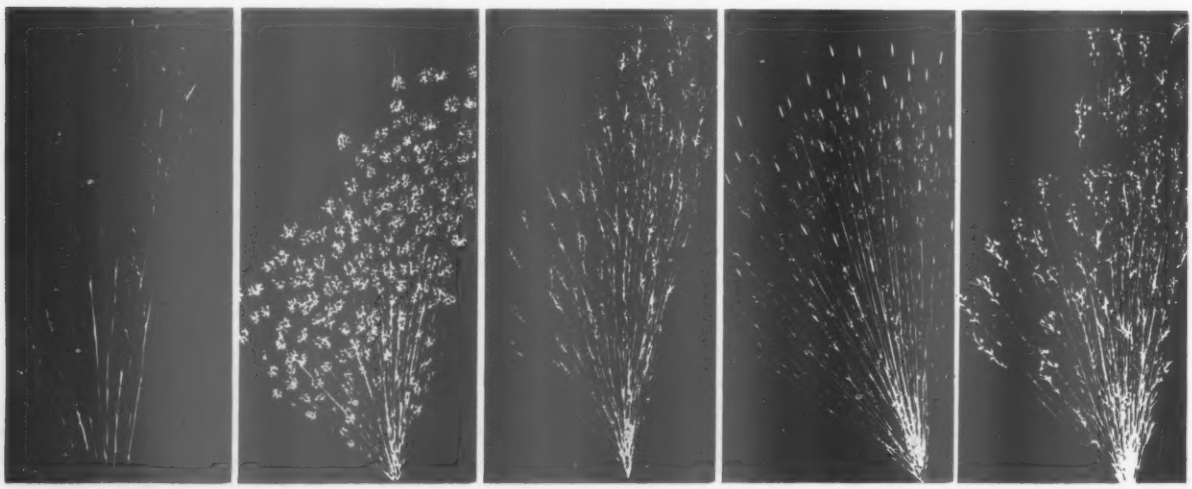


Fig. 1: Spark patterns of typical steels. From left to right, S.A.E. 1015, S.A.E. 1095, S.A.E. 3130, S.A.E. 4640 and S.A.E. 2340. Courtesy International Nickel Co.

ABSTRACTS

of papers presented before Petroleum Division, American Institute of Mining and Metallurgical Engineers, at Los Angeles, Calif., October 21-22

Flow Into Slotted Liners and Obstructed Core Samples

C. R. DODSON and W. T. CARDWELL, JR., Standard Oil Co. of California, La Habra, Calif.

THIS paper presents the results of a theoretical and experimental study on the effect of preperforated liners on well productivity. The analysis concerns the rectangular type of slot, either machine or torch cut, which is common in California. An application of the analytical methods to permeability measurements on mounted core samples was also undertaken to show the effects of sealing wax or other obstructions on the end faces of the cores.

It was found that the flux into short three-dimensional slots of the relative dimensions encountered in practice is approximately equal to that into full length two-dimensional slots having the same open fraction of pipe. (The same number of slot rows and the same radius ratio are also implied.) From physical considerations, the closeness of this approximation improves as the ratio of the external diameter to the internal diameter increases. Therefore, it is possible to calculate the flow into a slotted liner using a simple modification of the Darcy equation.

$$Q = \frac{2\pi kh\,(p_e - p_w)}{\mu\left(\ln\frac{re}{rw} + \frac{2}{N}\cdot\frac{\ln 2}{\pi\Omega}\right)}$$

where N is the number of the slot rows and Ω is the open fraction of the pipe.

High flux values are obtained for very small open fractions of pipe. For instance, with six slot rows and a radius ratio of 500, 74 per cent of the open-hole flux can be obtained with only 0.1 per cent of pipe open. The flux is greater with a greater number of slot rows.

The small magnitude of the effects of constricting the flow of oil, gas or water into liner slots indicates that decisions pertaining to liner-slot sizes should be based primarily on other considerations, such as sand retention and strength.

In a permeability measurement on a core sample whose length is approximately equal to its diameter, or facial side, a 30 per cent facial coverage may cause only a 5 per cent error in the result, whereas a 10 per cent coverage may cause but 1 per cent error.

Oil and Gas in the Great Lakes and How They May Be Developed

HENRY EMMETT GROSS, Chicago, Ill.

IN the Great Lakes, there are four places that appear attractive for prospecting for oil, (1) the west end of Lake Erie, (2) the northwest half of Saginaw Bay, (3) the east side of Lake Michigan between Benton Harbor and Ludington and (4) the shallow south end of Lake Huron. Gas without oil is possible anywhere in Lake Erie east of Pelee Island. These areas are all covered by less than 100 ft. of water.

The shallower parts of small bodies of water, such as Lake Erie, Lake St. Clair or Saginaw Bay could be prospected and drilled by means of submersible barges which could operate for about 8 months of the year. However, the author suggests the use of portable buoyant marine foundations which he estimates would cost about $3,000 for 30 ft. of water.

Three types are described, respectively for water up to 100 ft. deep, for water up to 600 ft. deep and a competitive type for shallow water.

To overcome the hazard of ice, the author recommends removal of the foundation after the well is completed. For gas wells, the well head and pressure gages are just above the lake floor and are visible from a glass-bottom boat. Lead lines are laid on the lake floor unless the wells are far from shore. In this case, a rock-filled cofferdam may be used as a central collecting point and compressor station and the gas piped inshore from this point.

An oil field could be developed in a manner similar to a gas field but made to flow to depletion on artificial water drive. No permanent foundations would be needed over the wells and a central water-treating plant and flow tanks would be built on a rock-filled cofferdam.

Fingering and Coning of Water and Gas in Homogeneous Oil Sand

M. G. ARTHUR, Union Oil Co. of California.

PRODUCTION of water from oil wells as a result of the pressure gradients established by flow of fluids through oil-producing sands is a common occurrence which influences the cost of oil production, the degree of depletion and the efficiency of expulsion of oil from naturally-occurring reservoirs. Control of water production and water encroachment are important both in primary and secondary phases of oil-field exploitation in order to produce oil and gas at lowest cost and in order to achieve the greatest ultimate recovery of the oil in the reservoir. Although many actual oil reservoirs present a multitude of variables which influence fingering and coning of water and gas, an inspection of the relationship and magnitude of the forces involved in the case of a homogeneous sand may indicate satisfactory methods of controlling water production. Application of equations relating the variables may indicate the geometric type of drainage which exists in a particular reservoir or in the vicinity of a particular well. A homogeneous sand body will be assumed within the drainage radius of the well.

Two geometric types of drainage are considerd. First, the case of water fingering into an oil sand which is relatively thin compared to the lateral extent of the sand. This sand may represent the entire oil-producing reservoir or it may represent an interval which is separated from other sand intervals by competent lithologic barriers to flow of fluids. The second case is that in which the water or gas entry into an oil well is a result of coning. The theory for this latter case has been developed by Muskat. This paper presents a graphical method of solving this problem.

A Statistical Approach to Interstitial Characteristics of Sand Reservoirs

JAN LAW, Dominguez Oil Fields Co.

PROBLEMS of recovery are attacked from the approaches dictated by the two strikingly dissimilar complexes that comprise an oil reservoir, the fluid complex and the sand complex. Knowledge of the fluid complex, due to labors in the fields of fluid mechanics and physical chemistry, has far outdistanced knowledge of the interstitial characteristics of the sand complex.

A concept of a sand reservoir is gained by the submission to a system of analysis, which stems from sedimentary geology, of the measurable expressions of that reservoir. These measurable expressions include core analysis which is the most pre-

(Continued on page 65)

Oil-Well Pumping Practices—No. 16

Surface Pumping Equipment —SPEED REDUCERS

by J. Zaba

In this installment the author continues his discussion of surface pumping equipment which began in the issue of October 14. The series as a whole began in the issue of July 1, and is so organized that each installment is a unit in itself which may be read without having to refer to previous installments.

THE transmission of power from the prime mover to the crank is one of the two functions which the transmission part of the surface pumping equipment has to perform. The other function is reduction of the necessarily high speed of the prime mover to the desired speed of the pumping cycle. This transmission of power and reduction of speed has to be accomplished smoothly without imparting vibrational shocks to the installation. Such shocks would be detrimental not only to the surface portion of the pumping installation. As previously discussed in this series (Installment 3) the shocks transmitted from the surface equipment to the sucker-rod string impose on the string loads which superimposed on the normal loadings may seriously affect the sucker-rod performance.

Evolution of the transmission part of the surface pumping equipment was a result of application of sound engineering principles both from the standpoint of materials used and from the standpoint of design. The evolution was necessitated by the demands imposed on the transmission by the changing characteristics of other component parts of the surface pumping equipment, particularly prime movers, and by changing operational practices. In the days when steam engines and slow-speed gas engines were used as prime movers of pumping installations and when the usual speed of pumping was from 20 to 30 s.p.m. the problem of transmission of power and reduction of speed was comparatively simple. Single reduction-belt and chain drives with suitably arranged ratios of pulleys and sprockets were a satisfactory solution. Demands imposed by introduction of high-speed prime movers and by frequently applied slowing down of the pumping cycle were met by countershafts arrangements which permitted double reduction of speed with belt or chain drives. Drives of this type, however, retained the inherent disadvantages of open-belt or chain drives. In case of belts, there was the question of maintaining the proper tension to eliminate the possibility of slipping or binding. Also there was the low efficiency of power transmission. In case of chain drives there was the difficulty of maintaining proper lubrication. Lack of proper lubrication usually caused rapid wear of chain and sprockets, resulting in jerky and uneven transmission of power. Introduction of geared and roller chain reducers led toward development of modern, compact, highly efficient pumping units. In conjunction with a V-belt drive, a modern reducer furnishes a wide range of speed ratios and the ease of changing these ratios by simple change of one of the V-belt pulleys.

Reducer Itself Undergoes Change

The geared speed reducer itself underwent considerable evolution since its introduction.[1,2] Original worm gear reducers furnished a smooth and silent medium of transmission of power, their transmission efficiency, however, was rather low. When the trend of field practices toward savings in operating expenses became more pronounced, the spur gear pumping unit was introduced. The spur gear was more efficient from the standpoint of transmission of power than the worm gear but was noisy in operation. Modern helical and herringbone-gear speed reducers combine quietness and smoothness of operation with high efficiency of transmission.

A geared speed reducer consists of several elements.[3] Each of these elements is a factor contributing toward satisfactory service of the unit. These elements are: (1) The high and low-speed shafts. The low-speed shaft connected through crank to the well load is subjected to torsion and bending. The high-speed shaft is subjected to torsion and also to bending if the reducer is connected to the prime mover by V-belt. (2) The bearings which are subjected to pressure, (3) the gears which have to withstand tension and wear, (4) the housing, which must resist pressure. An improperly designed housing may bring about eventual misalignment of gears. (5) The lubricating system, (6) the sealing system, the function of which is to prevent leakage of the lubricant and to eliminate intrusion of dirt and other foreign matter into the housing, (7) the foundation.

Of these seven elements the first four are beyond the control of the operator, except as far as selection of proper capacity reducer is concerned. Assignment by a reliable manufacturer of a certain rating to a given reducer implies the fact that in designing of the component parts of the reducer not only all the loadings expected were taken into consideration but also that proper weight was given to the nature of the oil-field service. This service with its severe and abruptly changing loadings requires special oil-field service load factors.

While proper design of these first four elements of the reducer is the responsibility of the designer, the operator can contribute toward satisfactory service of the reducer by operating practices leading toward the satisfactory installation and toward good care of the reducer. Maintenance of proper lubrication, with a recommended type of lubricant and providing the reducer with a suitable and stable foundation are within the control of operator and are of course essential to securing of such a satisfactory service.

Considering the reducer from the well side of the installation, the pull of the pitman creates, through the crank, a torque in the low-speed shaft of the reducer. Per definition, torque is a product of force and arm of leverage, this arm being the shortest distance from the line of action of the force to the center of shaft. Using symbols shown in Fig. 1 the torque on the low-speed shaft of the reducer can be expressed by the formula:

$$T = P \times \frac{S}{2} \times \cos. \theta \qquad (1)$$

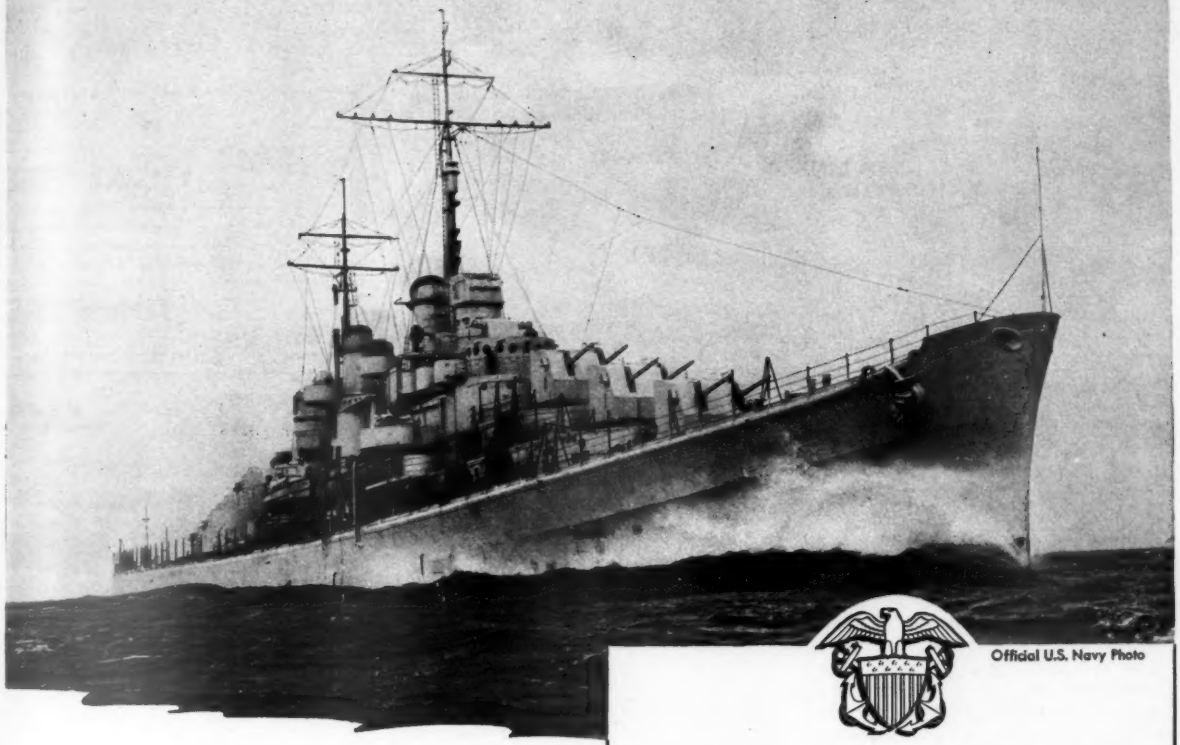
where

P is the pull in pitman in pounds.

It is apparent from this formula that the expression for T becomes a maximum twice during each revolution of the crank at the points where the center line of pitman becomes vertical to the center line of the crank. This occurs somewhere near the middle of the stroke and the equation for torque becomes:

$$T = P \times \frac{S}{2} \qquad (2)$$

At "Battle Stations" with the Navy



Official U.S. Navy Photo

This Naval Insignia is the officer's cap device, worn by all ranks from flag through chief warrant officers, in both metal and embroidered styles. It shows the new position of the eagle, facing right. The eagle was changed in May 1941 so it now faces the wearer's sword arm, the heraldic position of honor.

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On the other hand the torque becomes zero twice during each revolution of the crank at points where the center line of the pitman intersects the center of the low-speed shaft. The torque therefore is a function of pitman pull, angular position of crank and length of stroke.

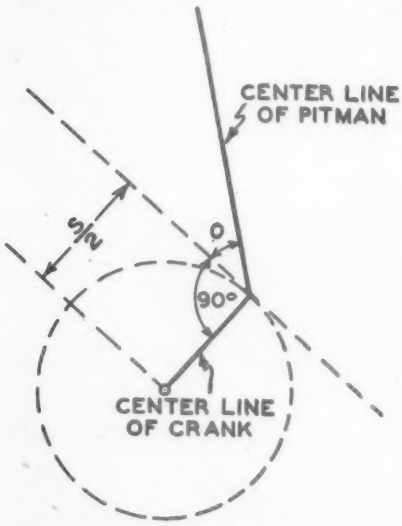

Fig. 1: Line drawing of pitman and crank

The relation between these three factors and torque affects the rating and selection of gear reducers and will be discussed again in one of the later installments of this series when rating of pumping units is taken into consideration. It is necessary, however, at this point, to make brief reference to this relationship in order to make the discussion of reducers more complete.

Effect of unbalanced well load.—Of the three factors affecting the torque the pitman pull represents the actual force creating the torque. For all practical purposes the pitman pull, manifesting itself at the low-speed shaft of the reducer as a twisting, and bending, force, is the unbalanced well load. For the upstroke part of the cycle this unbalanced well load equals the total well load at any given point of the upstroke less the effective counterbalance. For the downstroke part of the cycle, the load equals the effective counterbalance less the total well load at any given point of the downstroke.

The allowable torque of the shaft is the torque which the shaft is capable of transmitting continuously with safety. There exists therefore for any given reducer certain allowable torque which the reducer is capable of handling and once selected a given reducer determines definitely loading conditions and cycle characteristic of the pumping installation.

Since the peak torque occurs twice during each revolution of the crank the reducer must be designed for the peak value of the torque. Peak well load is being used to determine the unbalanced well load creating the torque. For the upstroke part of the cycle the peak torque formula can be written:[4]

$$T_{max} = (W_{max} - C)\frac{S}{2} \qquad (3)$$

where

W_{max} = peak well load on the upstroke, lb.
C = effective counterbalance, lb.
S = stroke, in.

This equation can be written:

$$W_{max} = \frac{2\,T_{max}}{S} + C \qquad (4)$$

For the downstroke part of the cycle:

$$T_{max} = (C - W_{min})\frac{S}{2} \qquad (5)$$

where

T_{min} = minimum well load during the downstroke, lb.

and other symbols as in previous equations.

Solving for W_{min}:

$$W_{min} = C - \frac{2\,T_{max}}{S} \qquad (6)$$

Consideration of Equations 4 and 6 indicates that reducer overload possibilities exist both during the upstroke and during the downstroke part of the cycle. In other words for an installation with a given reducer conditions may occur under which combination of maximum well load and counterbalance on the upstroke or minimum well load and counterbalance on the downstroke result in torque which is larger than the allowable torque of the reducer. Investigation therefore both of the upstroke and downstroke loads is needed when the question of torque in reducer is to be determined. The loads in existing installations should be determined from dynamometer cards. Use of general formula for determining the peak loads introduces, of course, the question of reliability of the results of the formulas used.

Position of crank.—Second factor affecting the torque within the pumping cycle is the angular position of the crank. It has been stated that peak well load is being used for the purpose of determining the unbalanced well load in calculations of torque. Since the maximum torque occurs at the position of crank at which the center line of crank is vertical to the center line of pitman, actually the use of the peak well load to calculate peak torque would be justified only if the peak well load would occur at the middle of stroke. It is a well known fact, however, that the peak well load does not necessarily occur at the middle of the stroke. In the hypothetical dynamometer card for instance, shown in Fig. 2 and representing a card for high speed of pumping, the peak load occurs at the beginning of the stroke. Because of the angular position of the crank at the point this peak load occurs, this load would have nothing to do with the peak torque. The load much lower than this peak load would

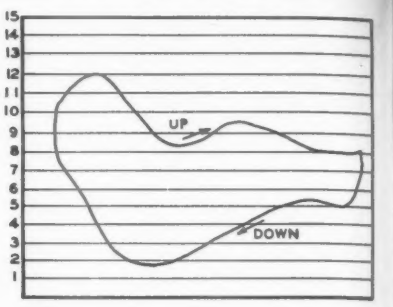

Fig. 2: Card showing peak load at the beginning of stroke

actually enter into considerations of the peak torque. The reason that the peak load, regardless of its position, is assumed, in torque calculations, to occur at the middle of the stroke, is the need for additional factor of safety. By assuming that the highest known load is acting on the longest available arm of leverage, a factor of safety is introduced which is needed and justified by the conditions of service under which a pumping unit reducer is operating.

Length of stroke.—The third factor which enters into calculations of torque of the reducer is the arm of leverage, that is the crank arm, equaling the length of stroke. To consider the relationship between torque and stroke, formula for peak polished-rod load can be used in the torque formula. This introduces factor of production and speed of operation.[5]

Using Slonneger's formula for peak polished-rod load (Installment 7) the formula for peak torque can be written:

$$T = \left[(W_r + W_f)\left(1 + \frac{SN}{5{,}400}\right) - C\right]\frac{S}{2}$$

where

W_r = weight of rods, lb.
W_f = weight of fluid, lb.
S = length of stroke, in.
N = number of strokes per minute
C = effective counterbalance, lb.

In this equation expression SN represents polished-rod travel, and what follows production, for any given diameter of plunger. It can be seen that with expression SN being constant, the torque T is directly proportional to stroke. For any given production therefore the torque to be handled by the reducer increases as the length of the stroke increases. To keep the expression SN constant with decreasing S, number of strokes N has to be correspondingly increased

(Continued on page 65)

Logistics-

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ASK THE MAN IN THE GREEN CAR

Cracking Technology—No. 7

Reforming Naphthas by Thermal Methods

by C. R. Wagner*

Reforming improves greatly the octane number of a naphtha; yields decrease with increase in temperature and pressure of reforming, octane number increases. Sulfur is removed largely by reforming operations. Careful attention must be given to the point of separation between the light gasoline fraction and the naphtha to be reformed, for best results from reforming and blending.

AS has already been mentioned, the refiner cracks heavy straight-run gasoline fractions, or reforms, in order to improve the octane number of the base stock to which he adds tetraethyl lead. The extent to which reforming is to be carried in any refinery is a nice problem for the chemist and for the operating foreman to solve. Should thermal reforming or catalytic reforming be employed? What boiling-range naphtha should be reformed? These and a dozen other questions at once present themselves to the refiner who is building a plant or who is concerned over the adequacy of his present equipment to meet quality demands.

For thermal reforming itself there is little difference in the equipment required from that for the cracking of light oil. Unless there is better use for the product elsewhere, the refiner may wish to consider recirculating through the reforming coil propane, propylene and excess butane-butylene. By so doing an additional yield and a higher octane number reformate may be produced. Of course some additional furnace and gas recovery plant capacity must be supplied. Because of the excess gas present a higher crack per pass may be obtained than in normal reforming operations, and due to this higher temperature and higher crack per pass the product will have a higher octane number than normal. See Figs. 1 and 2. Some polymerization of gas undoubtedly occurs also, which produces a high octane number product.

The refiner will at once realize that reforming naphtha produces an excess of butane, if his plant was in butane balance before he began to reform. He takes a naphtha which has a vapor pressure of 0.5 to 1.5-lb. Reid, and converts it by reforming into a product which may run from 10 to 12 lb. Reid if all of the butane is retained. If the plant was in butane balance before, it is obvious that butane must now be discarded, or vapor pressure specifications on the total gasoline produced will be exceeded. Even when the product is completely debutanized, its vapor pressure will still be too high. Since refinery butane has an octane blending value of somewhat over 100 (see Fig. 3), it is not to be lightly discarded.

In general, increasing the pressure on the reforming coil will improve yields, although the law of diminishing returns makes questionable the economic advisability of going much over 1,000 lb. sq. in. on the outlet of the coil. This may mean 1,500 lb. sq. in. or more on the coil inlet.

As the crack per pass increases, the yield of reformate correspondingly decreases, but the rate of improvement in quality of the reformate is not pro-

*Consultant in refining technology.

TABLE 1

Volume per cent yield	A. S. T. M. octane number	C. F. R. research octane number
100	34.0	33.7
95	41.0	42.8
90	47.7	51.5
85	54.1	59.1
80	59.3	65.3
75	63.0	69.9
70	65.5	73.7
65	67.6	76.6

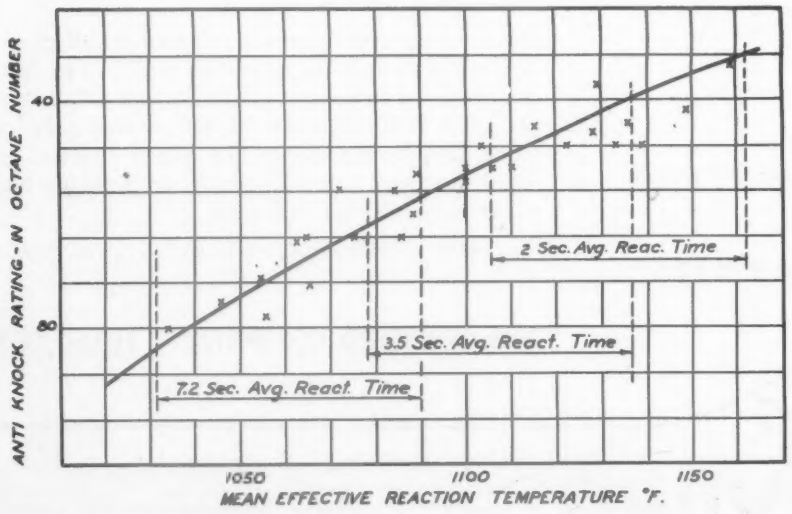

Fig. 1: Effect of reaction temperature upon octane number of product. (See paper by H. C. Schutt before A.P.I. in 1932, Proc. Am. Petroleum Inst., 14, III, 132, 1932)

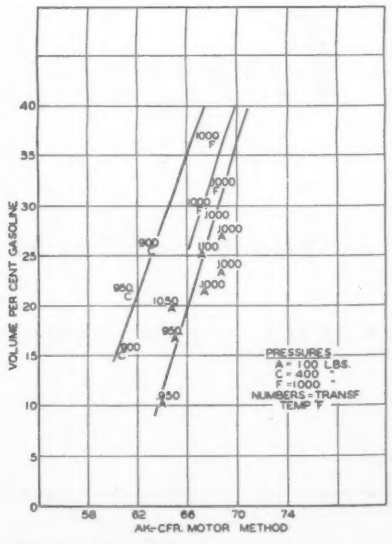

Fig. 2: Effect of crack per pass on octane number of product. (See paper by Keith, Ward and Rubin, Proc. Am. Petroleum Inst., 15, May 1933)

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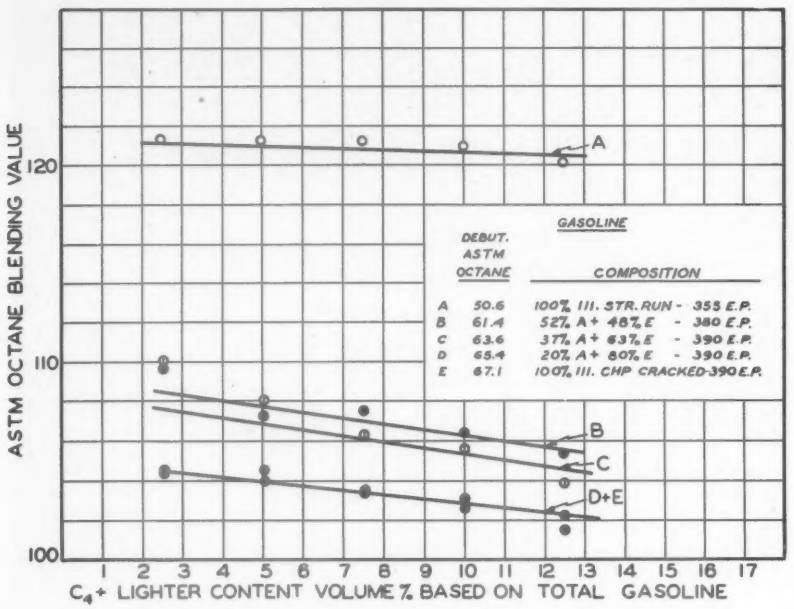

ASTM OCTANE BLENDING VALUE
120
110
100
A
B
C
D+E
GASOLINE
DEBUT. ASTM OCTANE
COMPOSITION
A 50.6 100% III. STR. RUN - 355 E.P.
B 61.4 52% A + 48% E - 380 E.P.
C 63.6 37% A + 63% E - 390 E.P.
D 65.4 20% A + 80% E - 390 E.P.
E 67.1 100% III. CHP CRACKED-390 E.P.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
C4+ LIGHTER CONTENT VOLUME % BASED ON TOTAL GASOLINE

Fig. 3: Blending value of refinery butanes. (Courtesy Pure Oil Co.)

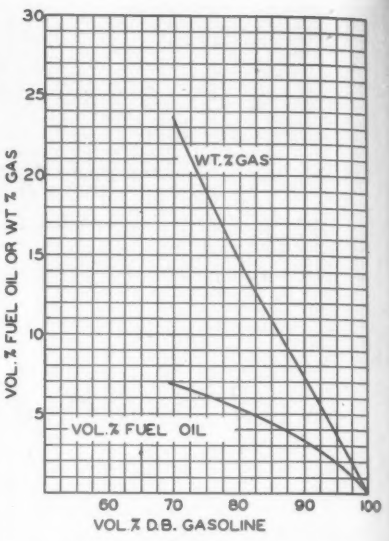


Fig. 5: Reforming Illinois naphtha. Volume per cent fuel oil and weight per cent gas versus volume per cent debutanized gasoline. (Courtesy Pure Oil Co.)

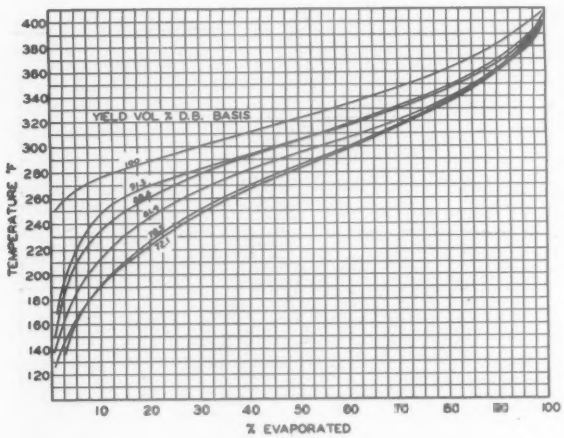


Fig. 4: 250-400° F. Illinois naphthas. D. B. Distillations. (Courtesy Pure Oil Co.)

portional to the rate of increase in crack per pass. This is clearly brought out by the data in Table 1, which contains information collected when reforming an Illinois naphtha of 250° to 400° F. boiling range at 750 lb. per sq. in. coil-outlet pressure. Yields and octane number are based on production of a debutanized reformate.

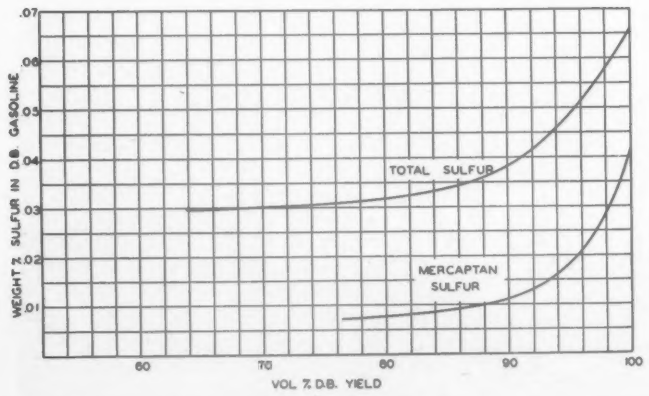
In addition to its effect upon octane number reforming has a pronounced effect upon the distillation range of a naphtha. In Fig. 4 are shown distillation curves on reformates made in connection with the tests on Illinois naphtha mentioned above. As the depth of cracking is increased, it will be observed that an equilibrium curve is approached.* If reforming is carried beyond this point, the principal effect is to increase the production of fixed gas and fuel oil. See Fig. 5.

Sulfur compounds are rapidly removed by reforming of naphtha although increasing the coil pressure is detrimental to sulfur elimination because pressure favors the combination of hydrogen sulfide and olefins to form mercaptans rather than the reverse reaction.

$$C_nH_{2n+1}SH \rightleftharpoons C_nH_{2n} + H_2S$$

Mercaptans are the principal com-

*Ferris, S. W., Ind. Eng. Chem., Vol. 752 (1941.)



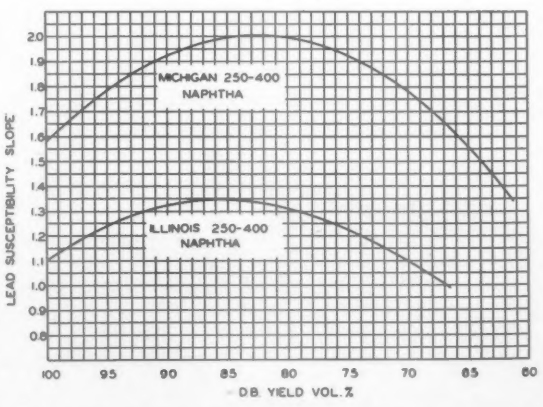


Fig. 6: (Left) Reforming Illinois naphtha. Sulfur content of gasoline versus depth of reforming. Fig. 7 (Right) Reforming Illinois naphtha. Lead susceptibility versus debutanized yield. (Courtesy Pure Oil Co.)

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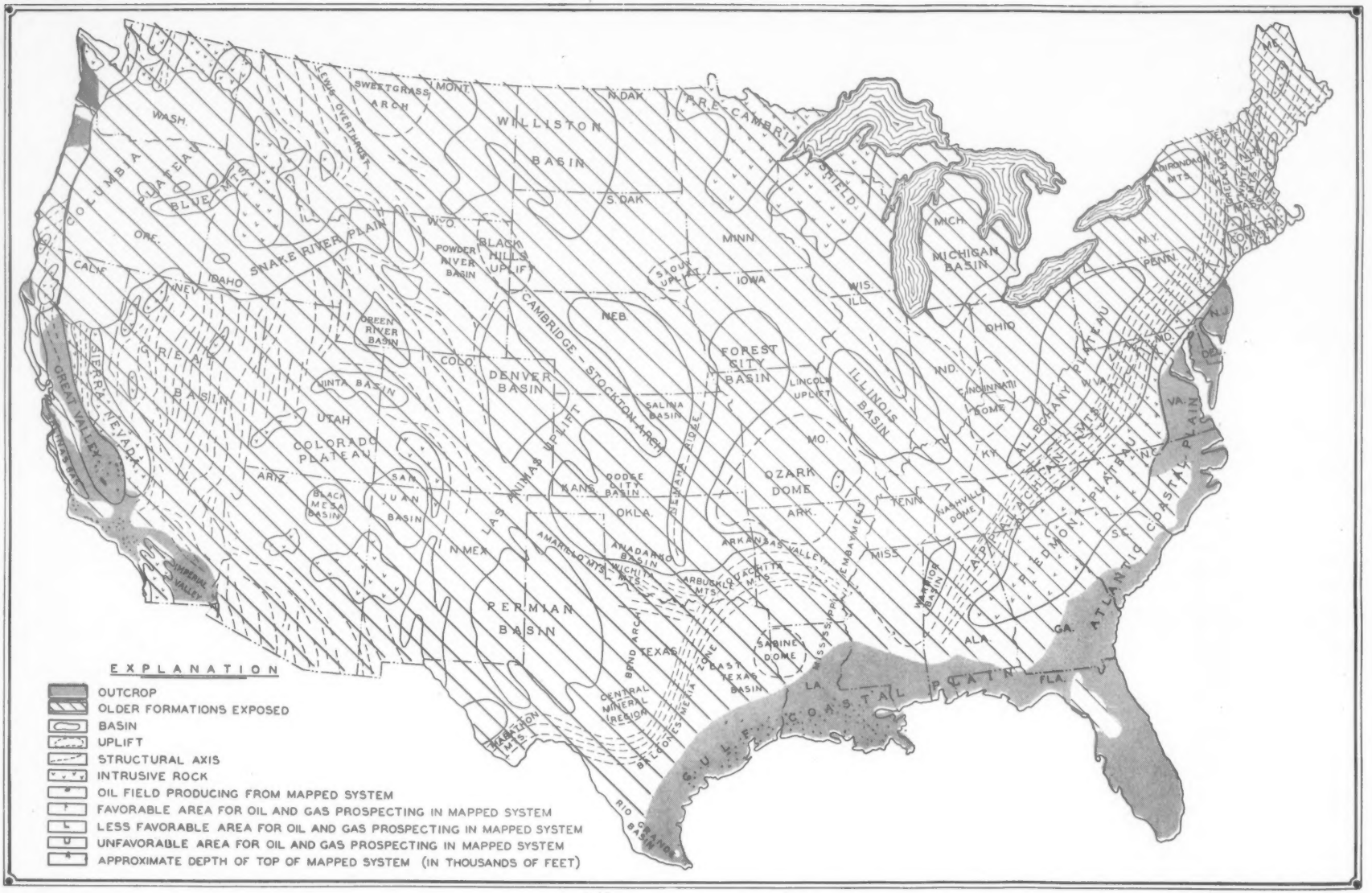
Miocene-Pliocene



OIL ZONES OF THE UNITED STATES

Miocene-Pliocene

(Compiled by The Oil and Gas Journal)

PRINCIPAL PRODUCING HORIZONS:

Sands: Vedder, Jewett, Temblor, Stevens, Chanac, Jacalitos, Etchegoin, Kern River and San Joaquin clays in San Joaquin Valley, California.
Vaqueros, Temblor, Monterey, Modelo, Repetto, and Pico in the coastal district of California.
Puente, Repetto and Pico in the Los Angeles Basin.
Lenticular Miocene sands with some Pliocene production in Louisiana and Texas.

DISTRIBUTION OF PRODUCING AREAS: In the San Joaquin Valley the lowest pay in the eastern half of the basin is the **Vedder** zone, a sandy member of the **Vaqueros** formation of lower Miocene age, producing at depths of over 10,000 ft. in Rio Bravo, Greeley, and Wasco. Toward the eastern flank, the Vedder also produces in Round Mountain with a shallower sand zone, the **Jewett,** above it. In the middle Miocene, the **Temblor** zone is the principal pay at Kettleman and also produces in the newly discovered group of fields north of Coalinga, Helm, Jacalitos, Raisin City, etc. The **Stevens** zone, of upper Miocene age, produces in the central part of the basin at Canal, Elk Hills, Strand, Greeley and other fields.

Pliocene production is limited to the edges of the basin with the **Chanac** zones of the **Etchegoin** producing at Fruitvale, the **Jacalitos** zone at Kern Front on the east side and Midway-Sunset, Coalinga, Belridge and other fields on the west. The **Kern River** zone of the **San Joaquin** clay produces at Kern River and other sands in this formation are productive at Elk Hills and Buena Vista Hills on the west.

In the Santa Barbara sector of the coastal district, the Pliocene produces at Summerland, the **Monterey** at Elwood and the Vaqueros in all fields. The Monterey is also the principal producing horizon in the Santa Maria district. All production in the Ventura district is from the **Pico** and **Repetto** (Pliocene). Some fields in the Ventura-Newhall district produce from the Pico and Repetto but the **Modelo** (upper Miocene) is the principal pay. In the Los Angeles Basin, except for small production at the top of the schist, all pays are of Pliocene and upper Miocene age. Pico production is less widely distributed than that from the Repetto and **Puente** (upper Miocene).

On the Gulf Coast, there are a large number of lensing pays in the Miocene and a few fields produce from the Pliocene. Generally these fields are close to the coast. In the Southeast Louisiana area, every field produces from the Miocene, except West Allen and Unknown Pass which are at the south edge of the Oligocene belt. The Miocene belt narrows to the west, the last important production being in the Saxet area in Nueces County, Texas. In the eastern districts, the pays are distributed through the Miocene and the irregularity of the sands makes correlation difficult. Towards the west, however, the pays are placed in the **Catahoula** (lower Miocene). There is, thus a rise in the age of the uppermost pays from west to east, as in the case of the Oligocene.

EXTENSION INTO OTHER AREAS: Deeper drilling in the San Joaquin Valley and coastal district of California is expected to find additional Miocene and Pliocene pays. There are also some undrilled structures in both areas. The best chances for developing new production in California appears to be to the north of the present producing area in the San Joaquin Valley. The Imperial Valley has been prospected but with no favorable indications.

As production in Southeast Louisiana does no go much north of Lake Pontchartrain, it is conceivable that the best possibilities for Miocene and Pliocene production farther east are offshore along the continental shelf. No indications of recent pays have been found in Mississippi or Alabama to date. The presence of artesian water in these formations makes the Atlantic seaboard an unlikely place for prospecing unless wells are carried below the Miocene.

GENERAL GEOLOGICAL CONSIDERATIONS: All formations from the Upper Cretaceous through the Pliocene are valley and basin fill and the geological history of the areas consists of a series of advances and retreats of the sea with numerous small unconformities and some continental deposits. These increase in volume in the upper part of the section in any district. Thus the areas contain a great number of wedge edges and erosional traps. Near the margins of the California basins structural movements have been sharp but elsewhere structures are gentle, except where salt domes have been intruded into the relatively soft sediments. The search for oil on structure has largely ceased in the developed areas and is now being directed to the traps which are not reflected at the surface.

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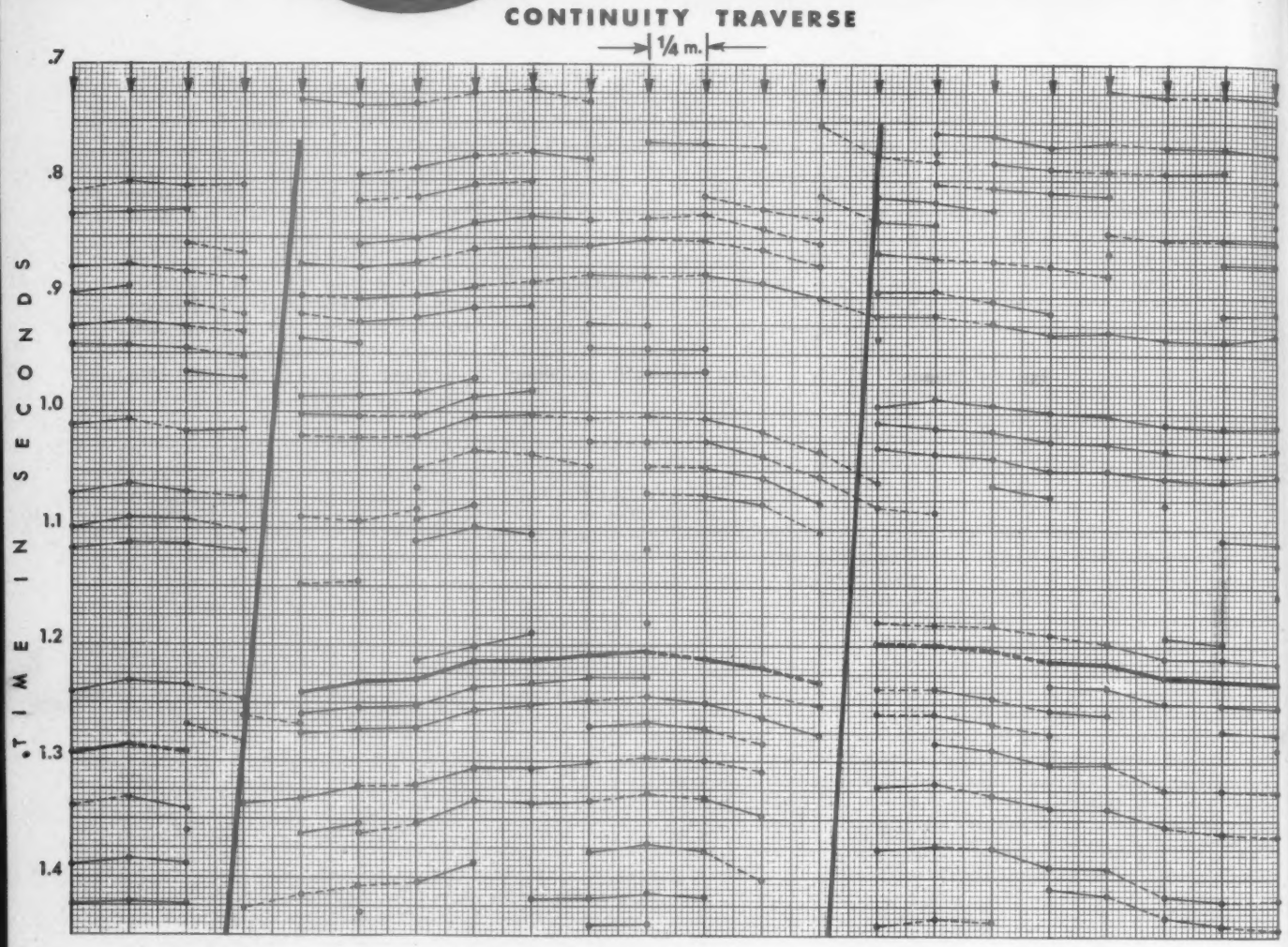

A Gulf Coast Reflection Seismograph Cross Section cutting two fault planes. Criteria for Faulting:

1. Linear zone of uncertain correlations or no reflections. (Solid lines certain continuity, dotted ones uncertain).
2. Rapid changes in direction and degree of dip approaching indicated fault planes.
3. Misclosure in reflection surfaces as shown by solid and dashed line. (This cross section is part of a closed shooting traverse).

Subsequent drilling has verified these fault predictions.

TABLE 2

Cut No.	Per cent of crude	A.P.I. gravity	Initial	50 per cent point	90 per cent point	Octane number
1	8.0	80.0	100	135	159	over 50
2	1.0	67.8	158	168	181	over 50
3	1.0	67.1	194	200	204	48.6
4	1.0	66.4	204	207	208	34.6
5	1.0	65.5	206	209	210	34.6
6	1.0	59.7	210	212	215	37.9
7	1.0	59.9	210	212	216	38.6
9	1.0	60.1	235	241	247	38.6
9	1.0	63.7	249	252	253	31.2
10	1.0	64.4	252	254	255	3.6
11	1.0	62.4	253	256	257	9.2
12	1.0	55.5	259	262	267	34.6
13	0.5	49.0	269	274	278	52.9
14	1.0	54.2	281	286	290	37.9
15	1.0	60.5	292	295	296	9.2
16	1.0	60.6	295	298	298	7.6
17	1.0	56.8	300	302	304	10.9
18	1.0	50.5	310	317	322	34.6
19	1.0	53.1	327	331	334	31.2
20	1.0	56.2	333	336	337	9.2
21	1.0	56.3	336	338	339	3.6
22	1.0	53.1	342	345	348	3.6
23	4.5	52.9	364	372	375	3.6
24	3.0	48.0	380	399	407	0.9

pounds split out by reforming, as can be seen by a study of Fig. 6. It is probable that the effect of reforming upon the tetraethyl lead susceptibility of the product is largely due to this mercaptan removal. From Fig. 7 it can be seen that the lead susceptibility starts to decrease as soon as the mercaptan removal rate slows up. The reader should not assume that reforming will always proceed in exactly the same manner as in the case of the Illinois naphtha described above. It is believed that the generalizations drawn are sound, but it is certain that variations in the chemical composition of the naphtha will cause differences in the results.

It is necessary for the refiner to determine what boiling range naphtha should be reformed and the temperature, or crack per pass, at which the reforming will be carried out. In general it may be said that it pays to fractionate as closely as possible between the light straight-run gasoline and the naphtha to be reformed. This would be inferred from an examination of the data in Table 2. Mount Pleasant, Michigan, crude petroleum was fractionated to give 24 cuts in the boiling range of gasoline and octane numbers of these cuts were obtained. It is obvious that in this instance a sharp cut should be made, throwing all possible n-octane into reforming naphtha and leaving all of the naphthenes and aromatics boiling below 250° F. in the gasoline cut. There is apparently little to be gained in this instance by attempting to throw n-heptane into the reformer charge, since there is a relatively large amount of methylcyclohexane and toluene present also. If a tower were available capable of cutting between n-heptane and methylcychexane then it would pay to consider making such a separation.

Oil-Well Pumping Practices

(Continued from page 60)

(assuming constant diameter of plunger). From the standpoint of the reducer therefore a short stroke and fast pumping cycle is desirable since it permits selection of a smaller reducer for any given production and in existing installation assures more satisfactory operation of the reducer because of the decreased torque. Relation between actual peak crankshaft torque, length of stroke and speed of operation is shown in Fig. 3.

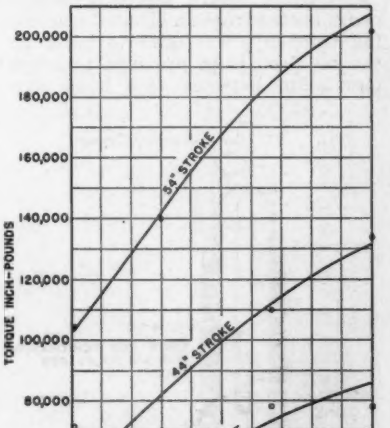

Fig. 3: Actual peak crankshaft torques-normal-slip motor rotary counterweights (from "Oil Well Tests Suggest New Rating Standards."—H. E. Dralle and E. H. Lamberger—A.P.I. Drilling and Production Practice—1941, p. 124).

The question of length of stroke is considered here only from the standpoint of the reducer. On any pumping installation, the question of effect of speed of operation on sucker rods (Installment 6), of length of stroke on sucker-rod pump (Installment 12) and individual well characteristics have to be considered.

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A.I.M.E. Abstracts

(Continued from page 57)

cise quantitative measure of the smallest, least continuous, sample of the reservoir. Core analysis data comply with the requisite of random sampling as stipulated by theoretical statistics.

A basic concept of statistics employs the following substitution: (1) The results of sampling are arranged as a frequency distribution. (2) The observed frequency distribution is compared to a mathematically precise distribution. (3) If a sufficiently good agreement is found between the two, the precise distribution is substituted in all subsequent operations involving characteristics of the sampled material.

This paper demonstrates that in some cases in the Dominguez field of southern California, if sufficient core analysis samples are taken over not too great a thickness of sediments, the resultant permeability and porosity assemblages give satisfactory agreement with normal curves. It also points out that the indications are strong that oil wells, wherein a satisfactory agreement is found, are predictable as to productivity.

Possible Application of Secondary Recovery Methods in California

C. L. MOORE, petroleum production analyst, PAW, District 5, Los Angeles, Calif.

ACTUAL operating experience with secondary-recovery projects in California fields is absolutely essential, in order to determine its value and the extent to which it may be successfully applied in this state.

Primary production methods will

ultimately recover about 10 billion barrels of oil from California fields. Over 6 billion barrels of this oil has been produced to date, leaving less than 4 billion barrels of remaining primary reserves.

California oil fields cover an area of about 200,000 acres. Tentative tabulated data on these fields show approximately 40 billion barrels of oil originally in place. The estimated ultimate primary recovery of 10 billion barrels is equal to 25 per cent of this oil in place, leaving a total residual oil, after primary recovery, of 30 billion barrels. It is estimated that about one-half of this residual oil is in the low-gravity fields where the viscosity may be too high for the successful application of established secondary-recovery methods. Of the remaining 15 billion barrels of residual oil, about 5 billion barrels is in the newer, deeper fields where more efficient primary-recovery methods, including pressure maintenance, should secure all of the recoverable oil and thereby eliminate the possibility of establishing secondary reserves in these fields. This leaves an estimated 10 billion barrels of residual oil in selected California fields, in which the established methods of secondary recovery might be applied. At the present time, no portion of these 10 billion barrels of residual oil can be set up as secondary reserves; they must be proven by one or more actual secondary-recovery projects in each of these selected fields before any of this residual oil can be classed as reserves.

The present situation with respect to possible secondary reserves from this residual oil in California might be compared with primary reserves to be developed from potential oil lands. In the latter case, primary reserves can only be established by actual exploration of these potential oil-bearing areas and likewise secondary reserves can only be established by actually exploring the possibilities of secondary-recovery methods in California.

Optimum Time to Bail and Wash Wells Producing Silt

J. R. STITT, junior engineer, Western Gulf Oil Co., Bakersfield, Calif.

CURVES have been prepared to show the optimum time to bail and wash wells following the removal of curtailment of production in the Fruitvale field. The producing horizons carry much silt which enters the wells and may cut the productivity of the wells as much as 50 per cent in a month.

The figures show the optimum time interval so as to produce a volume of oil which would result in the highest monetary return, the optimum time interval on maximum wells at different rates of decline and a master chart for determining the proper time interval for producing a well between wash jobs regardless of size or decline.

Gun Perforating for Multizone Control in California

T. H. WALLACE, superintendent, Western Oil Co., Bakersfield, Calif.

IN the past, the results of gun perforating have been accepted as satisfactory if the recovery was up to expectations. If not, it was because of gun perforating. No attempt was made to analyze the situation to find out if the number or size of the holes had been best adapted to the situation.

In order to analyze conditions in an area where a large number of old wells were to be deepened and new ones were to be completed in a section 800 to 1,200 ft. thick having 500 to 600 ft. of net oil pay, a well was drilled through several horizons. A solid liner was then cemented in place and the sand members were tested individually by gun perforation.

In one zone, production of only 10 bbl. a day was obtained while neighboring wells equipped with slotted liners were making 100 bbl. It was decided that some drilling fluid, followed by cement, had entered the sand and that it could not be cleaned by conventional methods.

As an experiment, an opposed swab assembly or circulating mandrel, see Fig. 1, with the opposed swab cups placed as close to each other as possible, aproximately 8 in. apart, was run. High-pressure pumping equipment, rented from an oil-well cementing company, was used to build up the required fluid pressure to break circulation between shot holes outside the liner and to pump the fluid volume desired for washing.

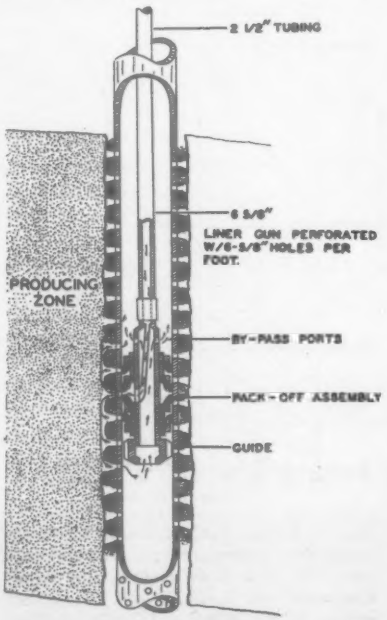


Fig. 1: Cross-section of circulating tool

Oil was used as the circulating medium and after more than 1 year the well is still making 100 bbl. of oil a day.

Similar procedures on other wells have given rise to considerable increases in production.

Bituminous Sands and Shales and Partly Depleted Subsurface Sands As Sources of Additional Oil in California

G. B. SHEA, petroleum engineer, Bureau of Mines, Petroleum and Natural Gas Division, San Francisco, Calif.

DEPOSITS of asphalt and bituminous sands and shales in California occur principally in the immediate region of the Coast Range on both the east and west slopes and at several points within the range, notably at Point Arena in Mendocino County, about 110 miles north of San Francisco; near Santa Cruz in Santa Cruz County; in the Edna area in San Luis Obispo County about 6 miles south of the city of San Luis Obispo; in the vicinity of Santa Maria, Casmalia and Sisquoc in Santa Barbara County; and in the Ojai and Santa Clara valleys in Ventura County. In addition, the oil-bearing sand outcrops near McKittrick and Maricopa in western Kern County are important sources of possible recoverable oil. Among the several prominent deposits of these source materials those occurring near Santa Cruz, San Luis Obispo, Santa Maria, Casmalia, and Sisquoc are the largest.

The occurrence of these bituminous sands and shales and other deposits in California has been known for a long time and recognized as potential sources of hydrocarbons. Much is known of their areal geology; but very little definite information is available regarding the minable tonnage and oil content of the deposits. Therefore, careful and systematic geological work, prospecting, and sampling are necessary to determine their value as potential sources of crude oil. The initial coordinated efforts of the Geological Survey and the Bureau of Mines, in collaboration with the Petroleum Administration for War, contemplate field and laboratory studies immediately dealing with several of the more important deposits to appraise their extent and oil content. The oil-saturated sand outcrops near McKittrick have been selected by the Geological Survey as a starting point for reasons previously enumerated, and a field crew now is mapping the area in which they occur. Sampling of the sands and laboratory work on methods for extracting oil from them by the bureau have been in progress for several months.

Processes for recovering hydrocar-

bons from bituminous sands and shales may be grouped into three general classes.

1. Separation by the action of hot water with or without the addition of reagents.

2. Separation by the action of solvents, such as petroleum distillates.

3. Separation by heat distillation.

The hot-water method of extracting oil from bituminous sands is preferable to the solvent or heat-distillation method in many practical and economic respects. Nevertheless, successful extraction of oil from sands by hot water depends on the amenability of the sands to the water-separation treatment. Laboratory tests show that all oil-impregnated sands do not exhibit the same susceptibility to water separation. Where the oil cannot be washed from sands by water alone the addition of a small quantity of sodium silicate or other alkaline reagent often has been found to aid in extracting the oil.

Oil can be separated readily from bituminous sand by the use of such solvents as petroleum distillates, and a number of such processes have been proposed. Successful commercial adaptability depends, however, on the first cost of the solvent and its availability under present conditions, loss of solvent, and cost of recovery of solvent from sand tailings and from the dissolved bitumen.

The Precipitation of Asphalt From Crude Oil by Flow Through Silica

HERMAN DYKSTRA, KARL BEU, and DONALD L. KATZ, University of Michigan, Ann Arbor, Mich.

TO find whether the flow of the oil through the silica caused the precipitation of asphalt, observations were made by the electron microscope of thin films of the original filtered oil and of the effluent from the flask.

The real object of the research was to find the effects of a counterpotential imposed on the oil flowing through the porous solid. A dry cell was used to put a potential of 1.4 volts (E_1 positive and E_2 negative) on the electrodes while oil was forced through the silica with air pressure. Greeley crude oil was used which had been stored under pressure.

Electron micrographs show that no asphalt particles are in the oil passed through the sand. It is possible that the precipitated particles were attracted to E_2 and thus removed from the oil, but it is doubtful whether all the particles would have been removed by this relatively low potential.

The formation of asphaltic or bitumen particles in crude oil during flow through silica has been verified. The potential measured is proportional to the flow rate and was of the order of 3 to 4 mv. per lb. per sq. in. pressure drop for a silica plug 2.1 in. long. Impression of a potential opposite in sign to that generated by flow upon the electrodes at the ends of the silica plug prevented the formation of bitumen particles in the oil. The laboratory data indicate that it may be possible to control bitumen formation in crude oil by impressing potentials across the porous solid through which the oil is passing.

Credit

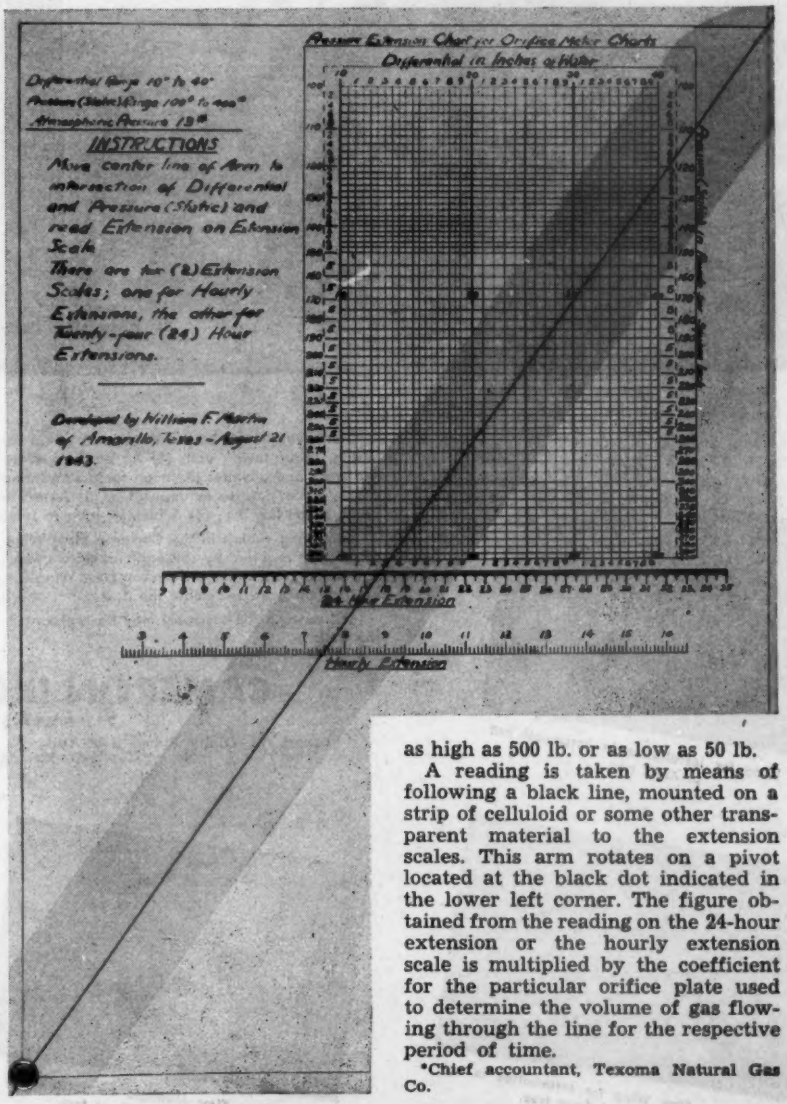
The article, "How Operators Are Fitting Equipment and Practices to Conditions," by M. Lyle Cashion, published in last week's issue, was a slightly abridged version of a paper presented at the meeting of the American Association of Oilwell Drilling Contractors. This credit was inadvertently omitted.

Scale to Aid Gas Pipe-Line Men

by William F. Martin*

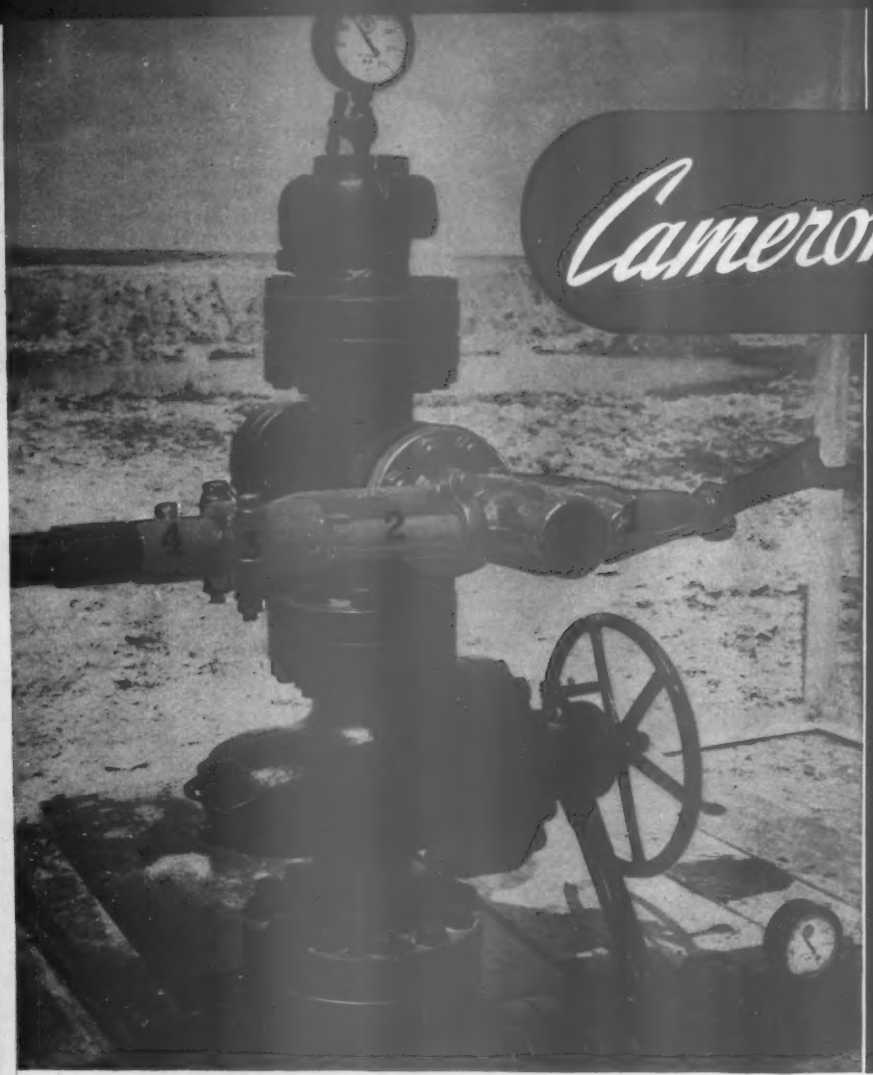
A NOMOGRAPH or scale has been devised to make it possible to calculate flow of gas without reference to extension tables. This may prove useful to field men.

The accompanying scale is presented as a suggestion rather than as a scale which would have direct application. In order to be useful at any given point such a scale should be constructed with proper consideration given to local atmospheric pressure. Differential in inches of water should be as high as 100 instead of 40. For a large number of field situations, pressure should be as high as 500 lb. or as low as 50 lb.


Pressure Extension Chart for Orifice Meter Charts
Differential in Inches of Water
Differential Range 10" to 40"
Pressure (Static) Range 100# to 400#
Atmospheric Pressure 13#
INSTRUCTIONS
Move center line of Arm to intersection of Differential and Pressure (Static) and read Extension on Extension Scale
There are two (2) Extension Scales; one for Hourly Extensions, the other for Twenty-four (24) Hour Extensions.
Developed by William F. Martin of Amarillo, Texas - August 21 1943
24 Hour Extension
Hourly Extension

A reading is taken by means of following a black line, mounted on a strip of celluloid or some other transparent material to the extension scales. This arm rotates on a pivot located at the black dot indicated in the lower left corner. The figure obtained from the reading on the 24-hour extension or the hourly extension scale is multiplied by the coefficient for the particular orifice plate used to determine the volume of gas flowing through the line for the respective period of time.

*Chief accountant, Texoma Natural Gas Co.



Cameron Flow Wings

FIT ANY MANUFACTURER'S
ANY STYLE, XMAS TRE

COMBINE ALL NECESSARY
WING FITTINGS IN A
SINGLE COMPACT UNIT

SAVE STEEL AND IMPART
GREATER STRENGTH TO
THE MANIFOLD

Here is a proven Xmas tree accessory that combines all necessary wing fittings in a single compact, steel saving, labor saving unit: (1) An easily operated valve which provides a pressure-tight shut-off for choke changing and obviates the need for a conventional wing valve (see photograph above); (2) A quick change choke, either positive or adjustable; (3) An efficient 2-bolt union which obviates the need for an additional union in the flowline; (4) A bleeder plug to release pressure trapped in the flowline.

Changing chokes in the Cameron Flow Wing is such a simple operation that it requires only a fraction of the time required by conventional chokes which employ cage nipples or other enclosures for the flow bean. The choke section of the Cameron Flow Wing is out in the open and is replaced by simply making two turns on a clamp screw to release the flow bean, inserting a new bean and tightening the clamp screw.

All parts in the assembly may be replaced in the field in a few minutes without removing the unit from the well.

Flow Wing for installation in horizontal run of Xmas tree.

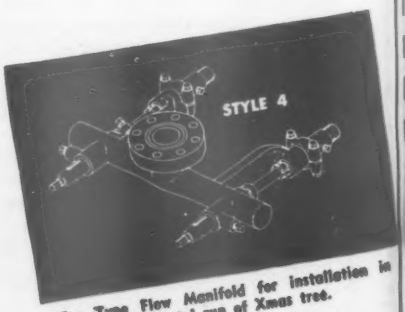
CAMERON IRON WORKS, INC.

711 MILBY ST., HOUSTON, TEXAS

Export: 74 Trinity Place, New York, N. Y. *California:* Howard Supply Co., Los Angeles.
Rocky Mountain: Mountain Sales & Service, Casper, Wyo.

Tee Type Flow Wing for installation in vertical run of Xmas tree.

Cross Type Flow Manifold for installation in vertical run of Xmas tree.



Tee Type Flow Manifold for installation in horizontal run of Xmas tree.

COST ANALYSIS—ENGINE REPAIR EXPENSE

IN any type of operation, maintenance and repair costs are the most convenient "yardstick" available for analyzing basic causes of failure and expense. This is particularly true of engines, where the repair costs are usually a direct indication of bad operating conditions or faulty design.

To facilitate the analysis, engine expense is usually broken down into a number of different items such as cylinder and head, fuel system, etc. A list of such items which would serve to segregate any prominent or recurring failures might include the following:

Subdivisions of Engine Expense

1. **Fuel system.**—On gas engine includes all piping from regulator to throttle valve. On oil engine includes all equipment to and including spray nozzle.

2. **Air-starting system.**—On larger engines requiring air-starting equipment, includes compressor, volume tank and all equipment to engine.

3. **Cooling system.**—Circulating pump, radiator or circulating tank, piping and all expense due to scale formation and corrosion of these parts.

4. **Ignition.**—This item usually connected with gas engines, includes spark plugs, high-tension cable, magneto, etc.

5. **Lubrication system.**—Includes grease cups, lubricators, pressure fittings and all expense due to adjustment and repair.

6. **Connecting rods and bearings.**—Replacement and repair.

7. **Pistons and rings.**—Repair, cost of inspection, removal of carbon, piston-rod packing, etc.

8. **Cylinder and head.**—Replacement and repair.

9. **Main bearings**—Alignment, adjustment and replacement.

10. **Flywheels, outboard bearings, stub shafts, etc.**—Items necessary to adjust, repair or align this equipment.

11. **Valves**—Fuel-mixing valves and chamber, combustion and air-intake valves, etc.

12. **Miscellaneous items.**—Governor, layshaft, cams, crosshead, exhaust system, air-filter and other items which usually are not a large source of expense.

In addition to the foregoing items, operating expense, which includes fuel and lubricating oil, is usually prepared on a separate statement. In order to afford some basis for comparison, all expense is computed as cost per engine unit-day. A unit-day is 24 hours operating time.

Investigation of Expense

Any recurring or frequent types of repair jobs noted in the analysis should be investigated. Cooling system expense is usually caused by corrosion or scale deposit. In such instances it may be possible to treat the water or change the source of supply. Accumulation of scale in the water jacket may also prevent proper cooling action, which results in overheating and cracking of the cylinder head.

Cylinder failures may be caused by lack of proper lubrication and consequent galling of the metal surface. In some instances, cylinder and head failures may be traced to poor engine design. Excessive piston and ring failures may be due to "overloading," poor cooling action, or lack of proper lubrication.

Fuel system expense is usually a prominent item for oil engines. In almost every instance, the trouble can be traced to the type of fuel which is used. The injection devices used on this type of engine are precision-made parts and the slightest amount of foreign material or "basic sediment" may cause improper functioning. Where sour crude is used for fuel, the injection equipment may suffer from corrosion and rapid failure results.

Relative amount of expense incurred by these foregoing items, for typical single-cylinder oil and gas engines, is shown in the accompanying figure. Such an expense distribution may vary for different makes of engines and different areas of operation.

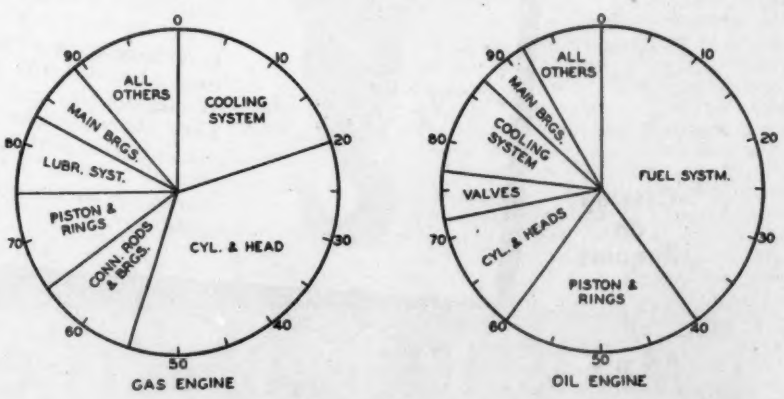


Fig. 1

BLOCK SELECTIONS
from the
McKISSICK CATALOGUE

★ *Buy* MORE WAR BONDS

LOGGING or LOADING BLOCK

Designed for heavy duty service. This block has heavy cast steel sheaves with line groove 1½" maximum. The large center pin is shouldered to prevent housings from pinching or spreading under heavy loads. Equipped with high speed bronze bushings or Hi Load roller bearings, and Alemite lubrication. Steel clevis with 1" diameter alloy clevis pins.

PEERLESS SNATCH BLOCK

This is an improved snatch block in the lower priced field. It is quick-opening, flexible and sturdy. It is safely locked and quickly released by improved locking pin. The yoke permits hook to swing as well as swivel, thereby relieving undue strain and affording greater flexibility. It is also available with swivel clevis.

ALLSTEEL HEAVY DUTY SNATCH BLOCK

This block was designed for all kinds of heavy trucking, tractor and rotary work. It is so constructed that it will not spread under heavy loads and is available with single, double, or triple sheaves. Swivel hook swings to one side to permit insertion of line. It is furnished in 12" x 6", 15" x 8" and 16" x 10" sizes. Steel swivel hooks or closed clevis are interchangeable.

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TULSA, OKLAHOMA

Engineering Fundamentals No. 111

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

CROOKED HOLE DISADVANTAGES

EXPERIENCED drilling contractors are fully aware of the many difficulties that may arise from attempting to finish drilling a crooked hole. Producers realize the many ill effects of crooked holes in connection with production operations. The land and legal departments of most companies realize that serious disputes may arise if a well deviates sufficiently from a vertical course that it produces from an exposed sand face located vertically within the bounds of a neighboring property of different ownership. Most geological departments recognize that sub-surface data used in correlation and other geologic considerations will be in error if the amount and direction of deviation of many wells from vertical is not known.

Because of the importance of maintaining a straight hole, a discussion of straight-hole drilling and well surveying would not be complete without pointing out the many specific disadvantages that may accrue to the operator who does not keep a proper check on the course of a well bore during drilling. It is hoped also to show the desirability, in at least some cases, of surveying old wells in order to have a more complete well record from which to diagnose well troubles and more intelligently correlate geologic well logs.

It is well at this point to distinguish a crooked hole from a deflected hole. Neither of these holes is a vertical hole. Either may show a considerable horizontal drift between various points in the well. For the purpose of this discussion, a deflected hole will be defined as one in which the change in deviation is gradual enough that no appreciable mechanical difficulties will result in finishing and producing the well. A crooked hole will be defined as one in which the deviation from vertical occurs within a relatively short vertical interval so that mechanical difficulties arise due to such deviation. It may be said that even in cases where the well bore is intentionally deflected from a vertical course it is always desirable to avoid drilling a crooked hole.

Drilling Difficulties

There are many specific mechanical difficulties that may arise in completing a rotary well which may be attributed to the fact that the hole is crooked. An excessive number of twistoffs in rotary drill pipe may be directly attributable to this cause. The flexure of the drill-pipe string during rotation in a crooked hole may cause early crystallization and failure. Rubbing of the drill pipe against the walls is more severe in a crooked hole and causes excessive wear of the pipe. If the hole is cased, the casing is also subjected to the additional wear, and casing leaks may result. Casing leaks are often very difficult to repair and must certainly be avoided whenever possible.

The additional frictional resistance to rotation of drill pipe in a crooked hole also causes a large increase in power requirements which adds to the drilling expense. It is believed that this increased power requirement may be in the order of 20 per cent in extreme cases.[1] The additional frictional resistance to rotation of the drill pipe in a crooked hole also adds considerably to the torsional stress in the upper part of the drill string, thus increasing the probability of occurrence of a twistoff.

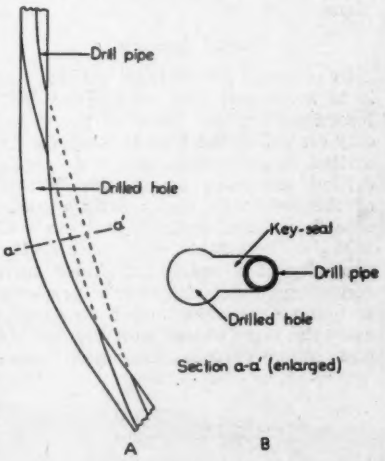


Fig. 1

"Key seating" may develop in an uncased crooked hole and cause considerable difficulty. The term "key seating" is applied to a condition resulting when the drill pipe, due to constant rotational contact with the wall on the concave side of a bend in the hole, erodes away some of the formation and develops a groove (or key-seat) in that side of the hole. The key-seat thus developed has a width only slightly greater than the diameter of the drill pipe and less than the diameter of the drill collar and bit. A vertical view of such a condition is indicated in Fig. 1-A, while a cross-sectional view of the key-seated hole is shown in B of Fig. 1. The difficulty due to such a condition arises during the withdrawal of the drill string from the well. When coming out of the hole the drill collar and bit become wedged in the grooved key-seat, and oftentimes the removal of the pipe from such a hole is a very difficult and troublesome operation.

A hole may be sufficiently straight to allow running and pulling the drill-pipe string and still crooked enough that difficulty will be experienced in installing casing in the well. This condition arises because of the fact that the casing will not bend to make as short a turn in the well as the drill pipe because of the larger diameter of the casing.

As mentioned in Installment 110 of this series, excessive weight on the bit is the principal cause of crooked holes. Similarly, when the deviation begins to approach the maximum allowed amount, the method of bringing the hole back to a vertical course consists of reducing the weight on the bit to a sufficient degree that the bit will gradually assume a more nearly vertical course as drilling continues. If the deviation is found by test to exceed the allowable limit at any point the hole is plugged back to a shallower depth at which the deviation is within permissible limits and a new hole drilled. Considerable loss of time is experienced in straightening the hole in either case, although the latter condition repre-

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

sents the greater loss. Records on a large number of wells show that the average loss of time, due to reduced weight on the bit in order to correct a hole approaching maximum deviation, amounts to about 6 days.[2] In case it is found necessary to plug back and redrill in order to straighten the hole, the loss of time is generally in excess of 6 days.

It has been found that when the deviation exceeds 3½°, it is very difficult to bring the hole back to vertical. In order to avoid difficulty, it is well that the deviation be detected before it becomes excessive (say, more than 2° in most cases.) This requires that deviation tests be run at close vertical intervals, usually from 50 to 200 ft., depending on conditions. The test should be made with the deviation instrument as near to the bottom of the hole as possible, which requires that the bit be practically on bottom at the time of the test and that the float valve or other obstructions, if any, inside the drill pipe be low enough to allow the deviation instrument to go close to the bottom of the hole inside the drill pipe. It is usually most convenient to make the deviation test with a "go-devil" type of instrument which can be dropped into the drill pipe and recovered when the drill pipe string is removed from the hole.

Production Troubles

Mechanical difficulties of very serious nature may arise when attempting to pump from a crooked hole with the conventional sucker-rod pump. The rods rub the tubing, which causes excessive wear of both rods and tubing. Due to the excessive friction of the rods against the tubing, the rods do not drop properly, which results in a tendency of the rod string to buckle and causes early failure of the rods. This frictional resistance also adds to the rod load on the upstroke, contributing to early rod failure. A further result of the frictional resistance of the rod string in the tubing is a decrease in the effective length of the plunger stroke. Cases have been reported in which inability to produce oil from a well with a sucker-rod pump was attributed to this condition.

Casing may be severely line-cut if swabbing is undertaken in a crooked hole.

Geological Considerations

Well-depth measurements are of necessity made along the course of the well which is not always in a vertical direction. Such measurements are commonly used in geologic studies as representing the vertical depth of the various given points below the surface. In either a crooked hole or a deflected hole, failure to consider deviation from vertical may result in a misinterpretation regarding the geologic structure and improper correlation between adjacent wells. Incorrect estimates of the thickness of formations are obtained if the various wells in a field go through the beds at varying angles due to deviation from vertical.

It is possible to overcome these geologic difficulties by surveying the well and correcting the well-depth measurements to allow for the deviation observed as well as locating the bottom of the well on a horizontal plane.

Legal Aspects

In order to avoid legal difficulties, it is important that a well be bottomed within the limits of the property on which the well is purportedly drilled. Particularly in deep wells drilled on small tracts, the bottom of the hole may easily drift a sufficient horizontal distance that the well will be bottomed well within the property of a neighbor. Under such conditions, the neighbor's property is being encroached upon to practically the same extent as if the derrick and other surface equipment were erected inside his property lines and oil sold from underneath his land.

The chart in Fig. 2* indicates the

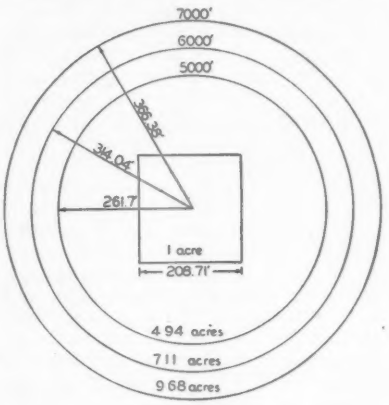


Fig. 2

amount that a well may drift horizontally when drilled to various depths even though its deviation does not exceed 3° from vertical. A well can bottom anywhere within a 523.4-ft. diameter circle at a depth of 5,000 ft. At 6,000 ft. the well could bottom anywhere within a circle of 628 ft. diameter, and at 7,000 ft. anywhere within a circle of 732.7 ft. diameter. Three degrees is considered very little deviation. In fact, wells with less than this deviation are commonly considered "straight." A study of Fig. 2 indicates that even in wells considered straight, there are possibilities of their deviating over considerable horizontal distances, which may result in unintentional trespass as well as geologic misinterpretation.

References

1. H. W. Westsmith and Lawrence R. Cook, "Crooked and Drifting Holes—Causes, Effects, and Some Suggested Remedies," Oil Bulletin, June 1929.

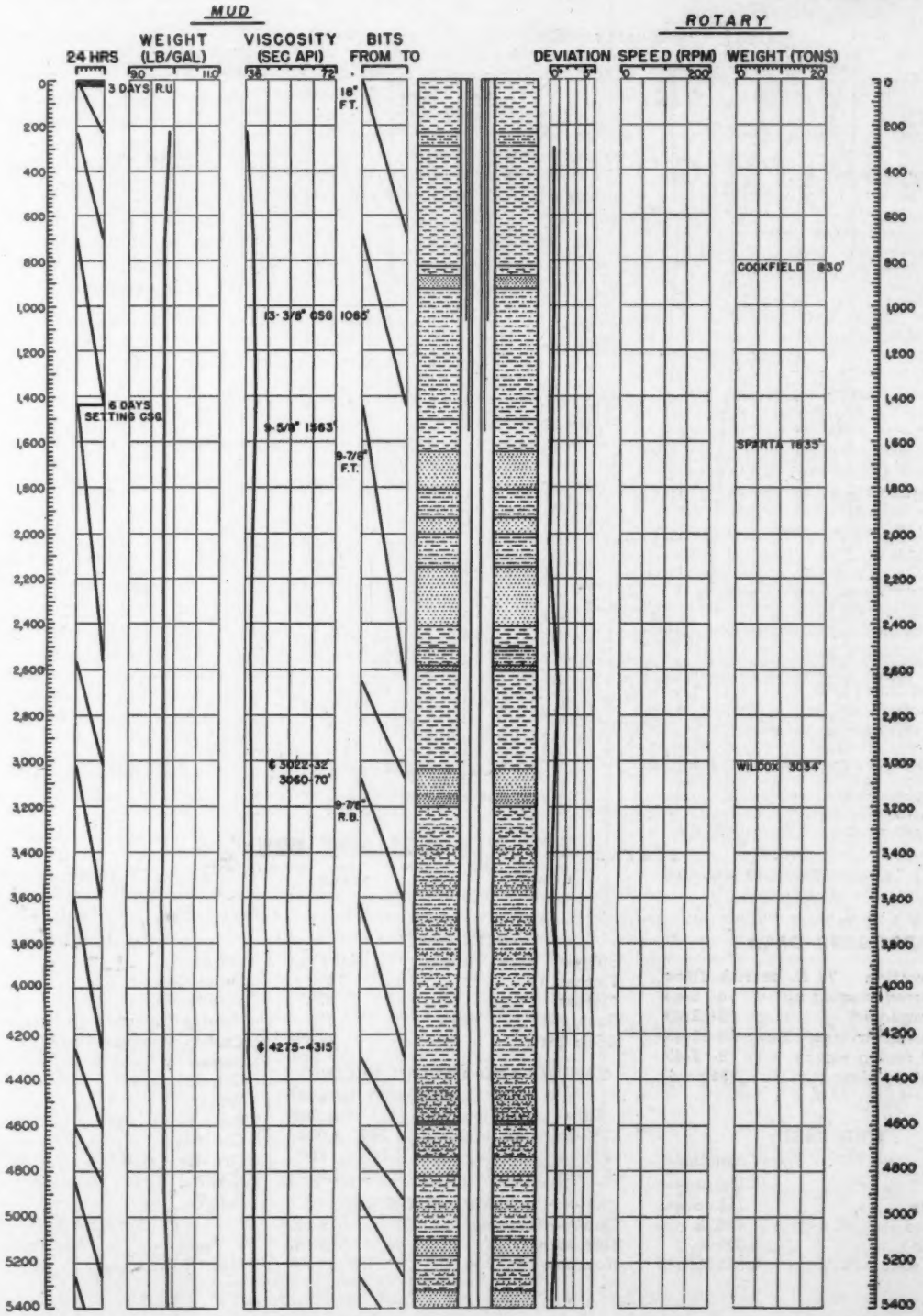
2. Drilling Equipment Directory, The Petroleum Publishing Co., 1941-42, pp. R-22 to R-24.

*Courtesy Lane-Wells Co.

Discovery Well, Holly Ridge Pool, Tensas Parish, Louisiana

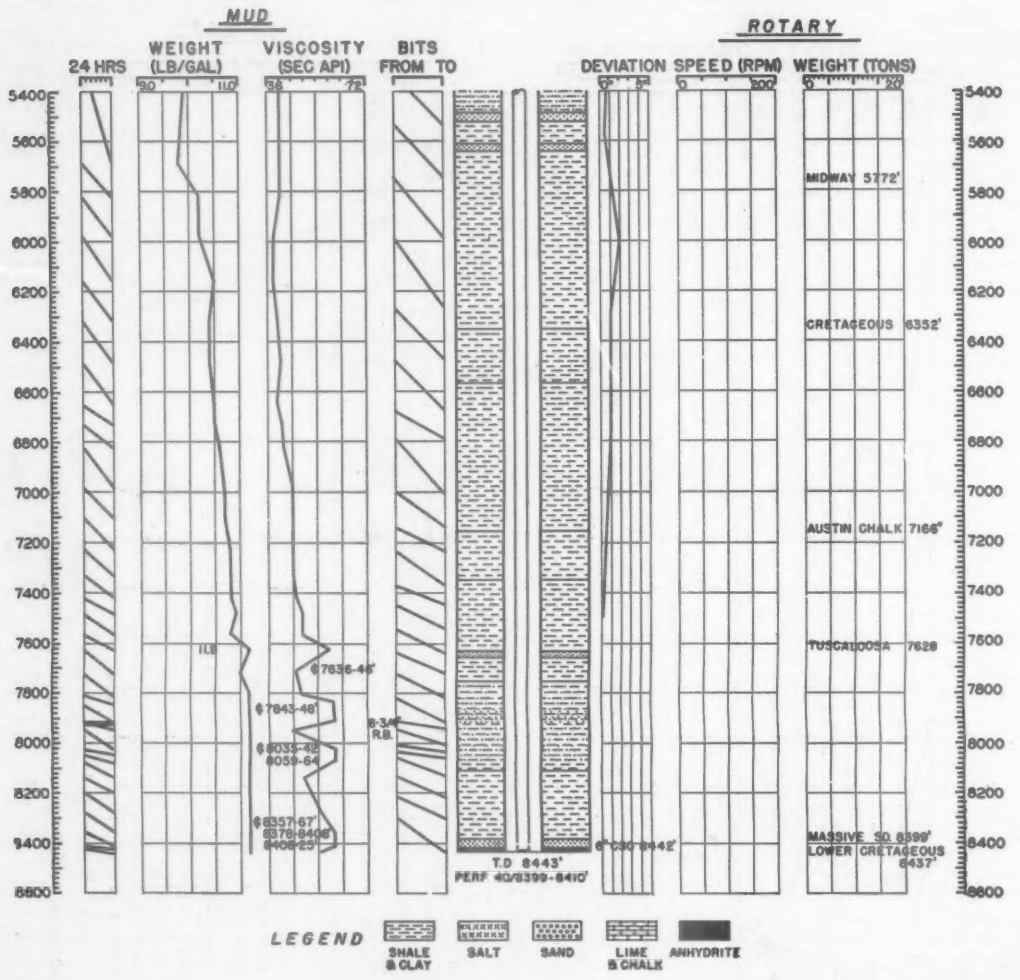
CARTER OIL CO 1 R. D. SHELLEY
SW NE 19-11n-10e

CONTRACTOR
Noble Drilling Corp.,
Tulsa, Okla.



Journalog

Discovery Well, Holly Ridge Pool, Tensas Parish, Louisiana (Continued)



DRILLING DATA

Well elevation	79 ft. derrick floor
Date started rigging up	6- 9-43
Date completed	6-12-43
Date started drilling rotary	6-12-43
Date set casing rotary	8- 5-43
Total rotary time	54 days

MUD USED

Type	Amount
Clay	156 sacks
Bentonite	219 sacks
Phosphate	100 lb.
Quebracho	9,500 lb.
Caustic soda	8,625 lb.

BITS USED

Type	Number	Size (in.)
Fishtail	2	18
Fishtail	2	9⅞
Rock bit	22	9⅞
Rock bit	8	8¾

CASING AND TUBING RECORD

Size	Weight	Depth (ft.)	Cement (sacks)
13⅜-in.	48-lb. H-40	1,064	1,000
9⅝-in.	32-lb. J-55	1,563	100
6 -in.	17-lb. N-80	8,442	1,000

COMPLETION

Gun perforating (8-8-43)	6 hr.
Size shots	½-in.
Number shots	48

PRODUCTION TEST

Date	9-20-43
Time flowed, hr.	3
Choke, in.	⅛
Tubing pressure, lb./sq. in.	1,525
Casing pressure, lb./sq. in.	1,700
Separator pressure, lb.	21
Oil, bbl./day	199
Water	None
Gas, M.c.f./day	155
Gas-Oil	781
Gravity, °A.P.I.	38.1
B.H.P., lb./sq. in. gage	3,923
B.H.T., °F.	234

CORE HEADS USED

Type	Number	Size (in.)
Hard formation	4	8¾

REFINING

Union Oil Co. Doubling Product Capacity

LOS ANGELES, Calif.—Union Oil Co. has announced that upon completion of its expansion and modernization program, the Wilmington, Calif., refinery will double its present production of gasoline and other refined products. Current construction work is expected to be completed by the end of the year and represents an investment of approximately $40,000,000.

Largest of the modern units integrated into existing refining facilities are a combination cracking plant, one of the largest of its type ever constructed, and a catalytic-cracking unit. The main fractionating tower is 170 ft. high. It has been estimated that the amount of steel used in this expansion program is the equivalent of that necessary to build 35,000 automobiles and that the steam to be generated in operation of the plant would be ample to take care of a town of 400,000 and the total heat consumption would supply a city of about 1,000,000 people. Electrical energy consumed would take care of 10,000 homes and approximately 100,000 gal. of water per minute will be required for cooling and other purposes.

The catalytic-cracking unit will be 20 stories high and will include an elevator and complete telephone service. Approximately 100 acres will be occupied by the additional equipment under construction.

Union's announcement last week followed an earlier disclosure by Richfield Oil Co. that it would soon start construction of new facilities to cost about $25,000,000. Preliminary work has been started at Richfield's

Sketches of Plant Operators

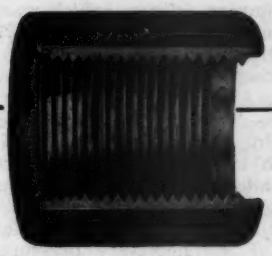
FREDERICK BOWERS KOONTZ, vice president in charge of manufacturing and a director of Mid-Continent Petroleum Corp., Tulsa, sprinkles enthusiasm for his grandchildren, thoroughbred horses, bird dogs and blooded cattle with his long-sustained interest in petroleum chemistry and how to apply his knowledge and skill to the processing of crude oil.

Mr. Koontz began his oil-industry career in 1906 as a chemist with Waters-Pierce Co., Tampico, Mexico, where he served for 3 years. He returned to the United States in 1911, married Marjorie M. Trude and became a chemist for Union Oil Co. of California at Oleum, Calif. Three years later, he accepted employment in the first refinery of the Shell Oil Co., Inc., on the Pacific Coast at Oleum, and in 1915 he accepted a position in the processing department of Standard Oil Co. of California.

He joined the Mid-Continent Petroleum Corp. (formerly Cosden & Co.) in 1917 and was process superintendent and manager of manufacturing, a post he held until 1928 when he was promoted to his present position of vice president in charge of manufacturing.

He was born July 14, 1889, in New Martinsville, W. Va. He was educated in high school and at Bethel and Staunton Military academies.

His hobbies are bird dogs, breeding but nonracing of thoroughbred horses, Whiteface Hereford and Black Angus cattle. He operates a thoroughbred nursery, the Military Stock Farm, near Lexington, Ky., and the Paulfred stock farm near Tulsa, named from a contraction of the names of his two children, Pauline Annette and Frederick Bowers, Jr.



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Wilmington refinery which was modernized and expanded in 1937 and which soon will include catalytic-cracking facilities.

The Area Production Urgency Committee recently listed high-octane gasoline as an urgency industry, which means that every effort will be made to provide construction men and operators for the plant when finished as well as facilitating fabrication of the necessary pressure vessels, tanks and towers. Special building permits are required and Los Angeles County engineers are at present inspecting plans for the Richfield unit.

January Completion Set For Associated Refinery

Production will be started about the first of next year at Associated Refineries, Inc.'s 100-octane aviation-gasoline plant now in the final stages of construction at Duncan, Okla. The approximate completion date for the new refinery was set last week after the War Department authorized construction and operating agents to release limited information on the installation of new facilities.

The basic plan of operation and an authorized description of the plant were published on Page 33 of the September 9 Journal. Eight independent refining companies in southern Oklahoma and North Texas will contribute to the charging stock required by the catalytic-cracking plant and the other manufacturing units.

Red Bank Oil Co. Acquires Lacey Plant in East Texas

NEW YORK. — Red Bank Oil Co. has acquired the Roger Lacey refinery at Kilgore, Tex., in the East Texas oil field, according to an announcement by Frank W. Bennett, president. The refinery has a daily capacity of 2,500 bbl. of crude oil and a 1,000-bbl. cracking plant.

Construction Men Hear Their Roles Eulogized

Construction workers in 40 plants now being built to make 100-octane aviation gasoline are getting first-hand stories on the use of this superfuel in aerial combat from members of two veteran bomber crews now touring the plants.

By arrangement with the War Department, crews of "Old Hellcat" and "Desert Warrior" are visiting the construction workers from the East to the West Coast and through the Southwest. Altogether, some 38,000 construction workers will see and hear the fliers on programs held in the refineries at which the 100-octane plants are being erected.

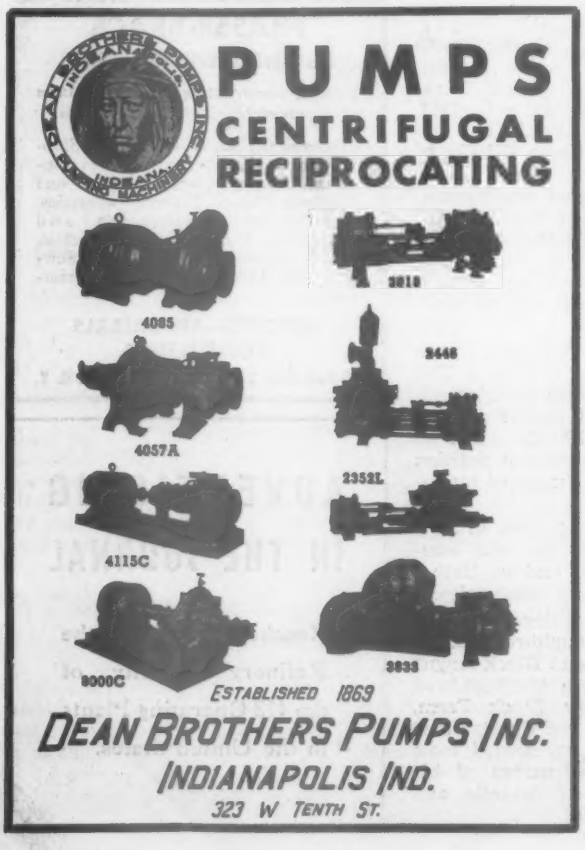
"Men who have been on combat missions and fought their way home know better than any others how vital 100 octane is to success in the air," Ralph K. Davies, deputy petroleum administrator, said.

McMurrey Plant to Resume Operation November 15

TYLER, Tex.—The McMurrey Refining Co.'s plant, shutdown for several months, will resume operation November 15. The refinery, which has a daily capacity of 7,000 bbl., has undergone extensive repairs.

Work on Crown Central's New Plant Is Rushed

HOUSTON, Tex.—Work is being rushed on Crown Central Petroleum Co.'s new refinery, which is to produce 100-octane gasoline. Construction has been under way for 11 months and 900 workmen are on the job.



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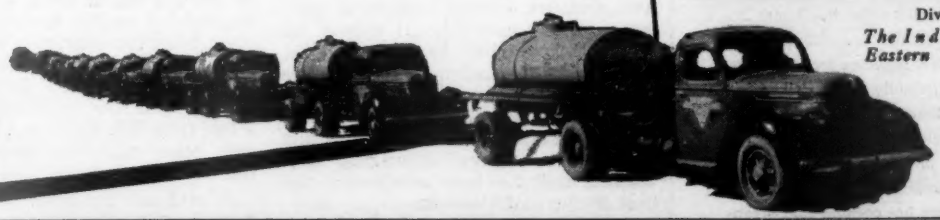

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PIPE LINES

Laying of WEP 20-in. To End in November

The remaining 115 miles of 20-in. pipe for the eastern leg of the War Emergency Pipelines, Inc., products line will be completed in November. Laying has been done at the rate of 5 and 6 miles per day recently.

This week the western leg of the WEP products line from Beaumont, Tex., to Norris City, Ill., is being filled with water from a canal near the Beaumont pump station. According to the plan the line will be completely filled from one end to the other before pressure testing begins. If testing proceeds normally, it should be finished November 10.

The rate of receiving crude at the Longview, Tex., terminal of the WEP 24-in. crude-oil line improved last week. In spite of delays earlier this month, a throughput averaging 307,000 bbl. daily has been attained in the first 24 days of October.

Work Progresses on Sinclair's Toledo Line

The 250-mile 8-in. products line under construction for Sinclair Refining Co. from East Chicago, Ind., to Toledo, Ohio, is scheduled for completion December 1. Work is well advanced in the laying of the line and at pump station sites. This line, which will have a capacity of 30,000 bbl. daily, has been privately financed. Estimated cost is $6,000,000.

Stanolind Proposes Unique Outlet for Wasson Pool

To provide for moving Wasson crude oil into the Slaughter, Tex.-Drumright, Okla., 16-in. line soon to be built, Stanolind Pipe Line Co. has devised a plan which would require a minimum expenditure of steel and would entail the least possible disturbance of existing pipe-line facilities.

The proposal is contained in an application received by PAW early this week. This calls for the construction of 10 miles of 8-in. from Wasson to closely follow the boundary between Gaines and Yoakum counties to Magnolia Pipe Line Co.'s 8-in. line to the Slaughter pool. Of the 22,000 bbl. daily to be handled through this spur, 10,000 bbl. would go south through the Magnolia line and 12,000 bbl. would move north to Slaughter. At the Slaughter end 7 miles of pipe of a diameter considerably larger than 8-in. would be required. The proposition has been studied jointly by the Stanolind and Magnolia companies and it is believed that if PAW approves, final details would be planned by the two companies.

Possible Rocky Mountain Pipe Lines Are Discussed

The large production possibilities of the Elk Basin field, Wyoming, indicated by recent developments has stimulated consideration of new pipeline outlets. In addition to the project for which Stanolind Pipe Line Co. has applied for permission to build a line from Elk Basin to Casper, Wyo., two other pipe-line possibilities for the area have been mentioned.

A proposal has been made to PAW for what is referred to as the Yale-Minnelusa project for building a line from Elk Basin to Billings, Mont. There has also been some discussion of building a products line from Montana and Wyoming refineries, to the Columbia River area of eastern Oregon and Washington.

A report has been sent to the U. S. House of Representatives warning of a critical petroleum shortage which might occur in the Washington-Oregon area.

It appears unlikely that a project will be undertaken for building a crude-oil line from West Texas-New Mexico fields to Los Angeles, Calif. An investigation by PAW of this proposal has been suggested by a House naval affairs subcommittee studying the petroleum situation.

Panhandle Gas Line to Move Texas Co. Crude

A line which has been in natural-gas service in recent years will be utilized by Texas Co. to move crude oil from the Texas Panhandle, according to reports. This line is a 152-mile 8-in. line which transported crude oil before it was converted to natural-gas service.

The company has been confronted with a problem which has arisen since it is gathering about 10,000 bbl. daily in the Panhandle while the capacity of its refinery at Amarillo,

Tex., is approximately 7,000 bbl. daily. The present plan is to store the surplus crude-oil at Lefors, Tex., for 2 months until a batch is accumulated for transportation via the line used for gas, previously referred to, so that the crude oil will go to the company's trunk system which will move it to Port Arthur, Tex. In the intervening time when the line is not shipping crude, it is reported that it will be in gas service.

Some connecting links must be built to provide for this movement. Texas Pipe Line Co. will lay 31½ miles of 6-in. from Quanah to Vernon, Tex. The company now has a 6-in. line from Vernon to Electra, Tex., moving oil produced in that area. Plans call for laying 18 miles of 4-in. from Vernon to Electra. At Electra the Panhandle crude will enter the company's trunk line.

Pipe-Line Deliveries to East Break Records

Deliveries of crude oil and petroleum products to the East Coast by pipe line reached an all-time high of more than 400,000 bbl. a day in the week of October 10-16, according to Acting Petroleum Administrator Ralph K. Davies, who made the following announcement:

"All of the reports of the East Coast petroleum supply situation last week are highly encouraging except for the discouraging fact that gasoline consumption, instead of declining to the volume certified by the PAW has instead moved slightly upward, and is exceeding our certification by more than 30,000 bbl. a day.

"Fortunately, every other fact available is favorable. Pipe-line deliveries increased again because of the opening of the New York branch of the big-inch line to about 406,000 bbl. a day, an all-time high. Heating-oil stocks rose sharply by more than a million barrels for the week, and are comfortably ahead of our supply program.

"Tank-car deliveries dropped slightly to 748,823 bbl. a day, but this was expected because, with the increased capacity of the big-inch pipe line, many of the tank cars formerly loading at the Norris City, Ill., terminal have been shifted to the longer Texas run. Others are temporarily out of service being cleaned to transport gasoline and heating oil instead of crude oil."

Humble Expands West Texas System

Humble Pipe Line Co. will loop its 6-in. line in Ector County, Texas, increasing capacity of its West Texas system. Three and one-half miles of 6-in. line will be laid in the loop in order to supply oil for Atlantic Refining Co., which is building a loading rack at Midland, Tex., for tank-car shipment to the East Coast.

While the loop will increase the capacity of the line to 38,500 bbl. of oil daily, only 28,500 bbl. will be moved into the Humble system running out of the county, with the remainder scheduled for delivery to the Atlantic. There is a possibility that it may be delivered to the Magnolia Petroleum Co. at Midland.

The loop will be laid south out of the Ector station of the Humble in the NE cor. 26-43-1n, T.&P. Survey, where additional pumping equipment is to be installed.

Humble also will install additional pumping equipment at its Odessa station which will increase its capacity between this point and Judkins from 54,000 to 60,000 bbl. of oil daily.

Correction

In an article entitled, "Machine Cleans Pipe With Steel Grit," p. 236, September 23, 1943, issue, a statement appeared: "By this method, used pipe can be cleaned at the rate of 5 to 50 ft. per day, depending on the diameter of the pipe." The correct rate is 5 to 50 ft. per minute. The grit cleaning machine used in this method is used in the program of Pipe Line Service Corp.

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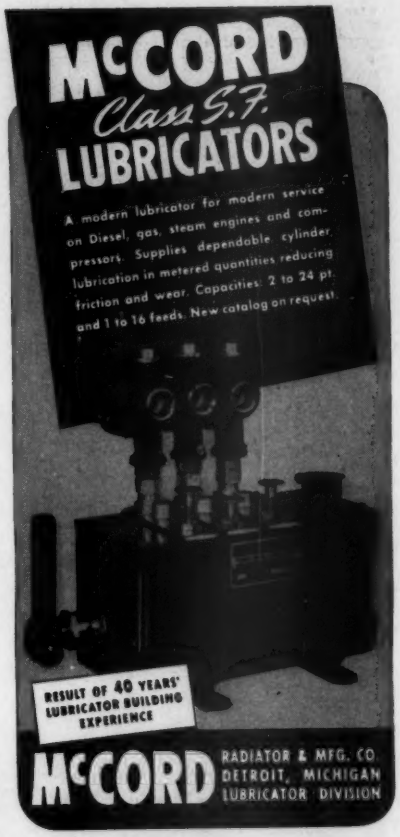
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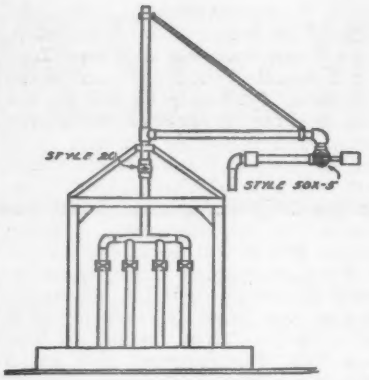

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Natural Gas

Lone Star Reorganization Requires Further Time

PHILADELPHIA, Pa.—The Securities and Exchange Commission set October 28 as the date for a hearing on the Lone Star Gas Co.'s request for another year in which to divest itself of certain properties involved in a reorganization program. The commission's original order, issued October 22, 1942, gave Lone Star a year for transfer of its interest in Texas Cities Gas Co., Dallas Gas Co., Council Bluffs Gas Co., and Lone Star Gasoline Co.

Pew and Ducker Advanced In PAW Natural-Gas Division

WASHINGTON, D. C. — Appointment of James E. Pew as director of the Division of Natural Gas and Natural Gasoline of the Petroleum Administration for War was announced last week.

Mr. Pew succeeds E. Holley Poe, who recently resigned to accept the post of executive vice president and general manager of the Petroleum Reserves Corp.

J. E. PEW

R. W. DUCKER

Robert W. Ducker succeeds Mr. Pew as assistant director of the division, and B. C. Adams, Jr., replaces the new assistant director as chief of the natural-gas section.

Mr. Pew held the position of assistant director of the Division of Natural Gas and Natural Gasoline since July 1943.

In 1923 Mr. Pew was employed by the United Natural Gas Co., of Bradford, Pa., where he was engaged in the construction and operation of a charcoal adsorption process natural-gasoline plant. During 1924 to 1926 he was with the Hope Construction & Refining Co., of Pittsburgh, working in the laboratory of the Mellon Institute on research and development studies in connection with natural gasoline and liquefied petroleum gases.

For 16 years, from 1926 to 1942, Mr. Pew was associated with the Virginia Gasoline & Oil Co., Charleston, W. Va. He advanced to superintendent in charge of the operation of the company's natural-gasoline plants and later was made manager of the Viking Distributing Co., a subsidiary organization engaged in marketing motor fuel.

Mr. Pew was called to the PAW in January 1942 as a member of the Production Division. When the Natural Gas and Natural Gasoline Division was formed in June 1942 he was made chief of the natural-gasoline section, and in July 1943 assistant director of the division.

Beaver-Butler Gas Co. Is Sold to Manufacturers

HARRISBURG, Pa.—Sale of Beaver-Butler Gas Co. to Manufacturers Light & Heat Co. of Pittsburgh for $25,000 was approved last week by the Public Utilities Commission. The Manufacturers company will rehabilitate the property.

United Gas Pipe Line Co. To Expand Its Facilities

WASHINGTON, D. C.—The Federal Power Commission last week issued a certificate of public convenience and public necessity to United Gas Pipe Line Co., Shreveport, La., authorizing it to construct and operate additional facilities in Terrebonne Parish, to meet rising demands for natural gas in the New Orleans and Mobile Gulf Coast areas. It also authorized United to remove certain unused pipe-line facilities needed in other parts of the company's system from the Waskom area in Harrison County, Texas, and Caddo Parish, Louisiana.

The proposed new construction includes approximately 2½ miles of 4½-in. pipe line extending from the South Houma gas field to connect with United's 12¾-in. line from the De Large field now being built. The company serves numerous war industries as well as domestic and commercial consumers in the Gulf Coast territory. To meet estimated peak demands it plans to obtain approximately 9,700,000 cu. ft. of gas daily in the South Houma field by purchase from Shell Oil Co., Inc. This supply will be supplemented by gas from a new well to be drilled in the De Large field by Union Producing Co. The total additions are expected to enable the company to utilize the full remaining capacity of its Lirette-New Orleans line, Lake Long-St. Rose line, the proposed Lake Long-St. Rose Loop, and Lirette-Mobile lines in meeting increased demands for natural gas.

Standard's Divestment Plan Receives SEC Approval

PHILADELPHIA, Pa.—The Securities and Exchange Commission last week approved the plan proposed by Standard Oil Co. (New Jersey) to divest itself of control of its gas utility subsidiaries by transferring them to Consolidated Natural Gas Co. in exchange for all the capital stock of the latter and then distributing the Consolidated stock to its own common stockholders.

Standard of New Jersey is to receive in exchange the 2,728,359 shares of capital stock of Consolidated with par value $15. Standard then will distribute the Consolidated stock to its own stockholders on the basis of one share of Consolidated for each 10 shares of Standard of New Jersey common now outstanding.

Natural Gasoline

Root's Aviation-Gasoline Plant Nearing Completion

EL DORADO, Ark.—Construction of a plant to produce 100-octane gasoline is being rushed to completion here, it was revealed by the Root Petroleum Co. last week, following lifting of War Department secrecy orders.

The plant has been under construction approximately 14 months, and more than 600 men have been employed in the work. The plant will be completed within a few months.

Repressuring System for Slaughter Pool Planned

FORT WORTH, Tex.—Plans for installation of a gas-repressuring system for the Slaughter pool in Hockley, Cochran and Terry counties, Texas, were discussed at a meeting in the Texas Hotel here last week, attended by 85 per cent of the operators in the area. Engineers and gasoline-plant operators reviewed the practicability and cost of the project. Another meeting will be held when further data have been obtained.

With One Rig →

All of the savings operators have found the world over in Franks portable rotary drilling rigs and telescoping derrick servicing units are now combined in a double duty combination drilling and servicing machine, which even further increases the economies which Franks' pioneering has brought to the petroleum industry.

A 90-foot (when extended) telescoping derrick (58-foot when telescoped); drawworks, power plant, rotary table, crown block, stacking board and all essentials are an integral part of the unit. The pumps are skid mounted and can be carried on an auxiliary truck, when needed for drilling operations.

The unit will service wells up to 10,000 feet and handle shallow and medium depth standard drilling and deep "slim-hole" and exploratory drilling. It also is used for deepening and cleanout work.

The derrick is Franks tested and proven telescoping type, which permits ample clearance and it is equipped for handling rods and racking tubing or drill pipe. Move-in and rig-up time for servicing jobs is usually less than 45 minutes, while actual erection time of the derrick requires less than 10 minutes, by means of Franks patented power screw raising device. The complete machine, including the derrick, travels over the road with the blocks and lines strung.

The Franks propeller-shaft driven rotary table and drawworks is driven by a single HBS-600 200 H.P. Cummins Diesel Engine motor through Franks patented power take-off. The motor is also used to drive the truck.

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6. Portable derrick can be left standing full of tubing in the field while hoist is used under a standard derrick or with other equipment.

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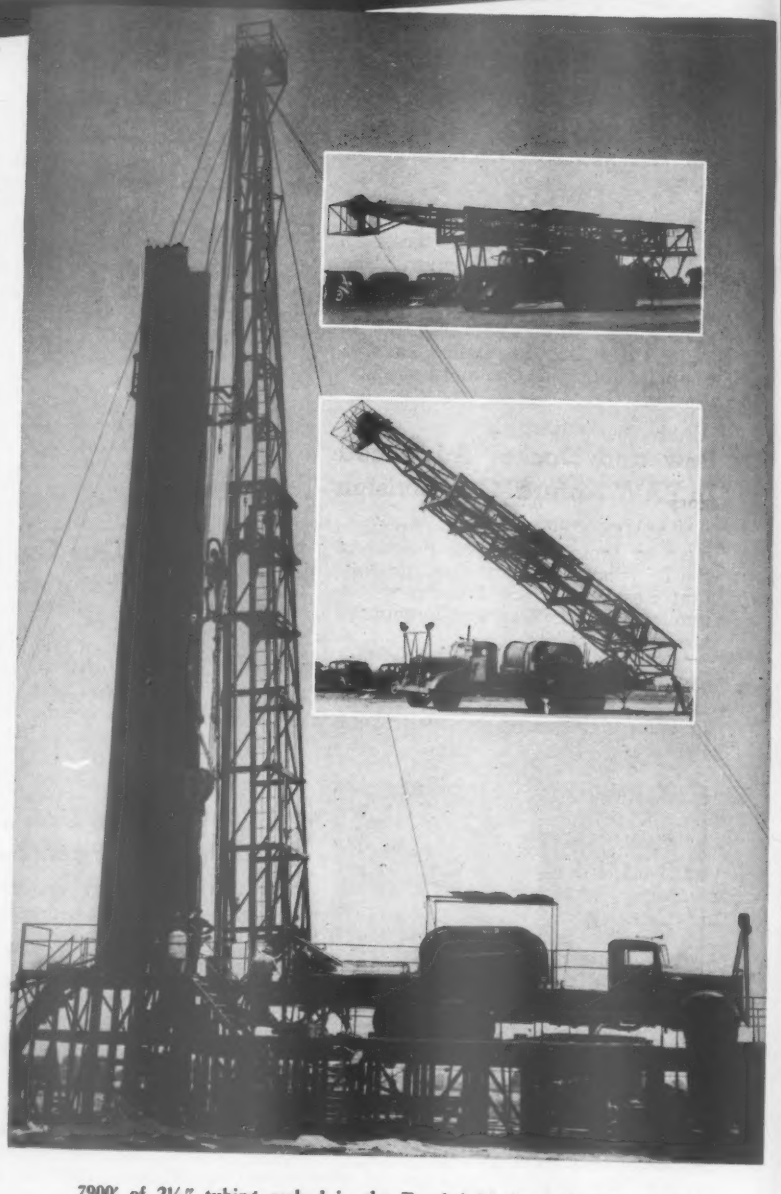

7900′ of 2½" tubing racked in the Franks' Model 7000 D.D. "Self-Propelled" Telescoper at Riverdale, California. Sub structure is used only where blowout preventer is above ground.

Insets show Franks' Model 7000 D.D. "Self-Propelled" Telescoper in "Over-the-Road" position and in the process of raising the derrick.

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Exploration and Drilling

Week's Highlights

JUST at the time when most observers have begun to write off 1943 as another poor discovery year, so far as important fields are concerned, news breaks which may make the current year the best since 1938. The deep Ellenburger production of West Texas has large potentialiies, although high drilling costs may slow up development. In Wyoming, the great extent of the newly developed Tensleep production added several hundred thousand barrels to the state's proven reserves and last week's discovery at Gebo dome also falls in the category of major finds. This field is even more important than Elk Basin in two respects. It is actually a 1943 discovery, while Elk Basin is on a structure which has produced from shallow sands for more than 25 years. It is also in a part of the Big Horn basin which was not highly regarded and opens the way to more prospecting on the east flank.

Last week, also, King County on the east side of the West Texas basin showed possibilities of its first field which would be a link in the possible connection between the North and West Texas producing areas.

This week, additional developments are reported of more than average significance. First in interest, although not in immediate potential value, is the discovery of oil in southwestern Florida (p. 81). Analysis of this discovery suggests caution in joining any land-boom excitement. Announcements on this well suggest that the oil is very similar to that found on the Gulf Coast and the further suggestion is made that it may mark an extension of the Gulf Coast area far to the south and east.

Actually, the discovery has little to do with other Gulf Coast fields since the pay is in the Cretaceous, Lower Cretaceous from some reports. That is, it is in a formation which does not produce on the Gulf Coast or in any area closer than the East Texas basin and the fields around the Sabine arch in northern Louisiana and Arkansas. In order to reach the pay it was necessary to pass through the Florida equivalents of every coastal pay that occur in this area.

Another factor of importance is that the Sunniland find is separated from the coastal area by a regional high north of Tampa, the Ocala dome, which presumably swings the Gulf Coastal section to the southwest. Whether these formations swing around again to the southeast into the southern end of Florida is not known. The writer's view is that the Florida discovery has much more significance for the Atlantic seaboard than for the eastern Gulf Coast.

Formations carrying fresh water are known to underlie the Atlantic coastal plain and this fact has discouraged much prospecting. However, salt water and oil-bearing formations may lie at depth. Cretaceous and Lower Cretaceous formations are present from Long Island to southern Florida and the find may have been in part responsible for announcement of leasing on Maryland's eastern shore (p. 87).

As for the discovery itself, the well is reported to have made 212 bbl. of heavy oil. Water troubles may be cleared up but present indications are that it will not be a big well. Eleven thousand-foot wells in swamp locations have to look pretty good to pay out.

In West Texas, shows of oil are reported in a wildcat in eastern Hockley County, 22 miles northwest of the Slaughter field (p. 93). This showing is reported in the Holt pay, which lies below the San Andres producing horizon in many West Texas fields. Possibilities of finding San Andres oil east of present production have been con-

COMPLETIONS IN ALL FIELDS . . .

(Week ended October 23, 1943)

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1943	1942
N. Y., Penna., W. Va.	41	14	7	62	122,184	2,770	2,790
Ohio	1	10	7	18	44,513	744	921
Indiana	2	0	4	6	12,283	181	280
Kentucky	2	1	5	8	15,535	346	158
Illinois	26	1	13	40	97,379	1,431	1,436
Michigan	1	0	8	9	28,932	489	571
Kansas	21	0	13	34	102,525	1,337	1,276
Nebraska	0	0	0	0	0	26	30
Missouri, Iowa	0	0	2	2	1,693	15	13
Oklahoma	8	3	10	21	77,697	954	962
Texas:							
North Central Texas	22	0	15	37	86,637	1,190	898
West Texas	21	0	5	26	109,728	716	1,131
Texas Panhandle	3	1	0	4	12,772	146	290
Eastern Texas	2	0	4	6	27,906	236	326
Texas Gulf Coast	7	0	2	9	57,721	370	579
Southwest Texas	10	1	9	20	118,894	742	855
Total Texas	65	2	35	102	313,658	3,400	4,079
North Louisiana	2	1	6	9	39,038	258	383
Louisiana Gulf Coast	2	1	3	6	58,398	289	393
Total Louisiana	4	2	9	15	97,436	547	776
Arkansas	7	0	5	12	60,845	212	141
Mississippi and Southeast	0	0	0	3	29,020	75	48
Montana	5	0	2	7	15,053	186	168
Wyoming	1	0	0	1	4,640	113	92
Colorado, Utah	0	0	0	0	0	21	20
New Mexico	6	0	0	6	15,380	189	198
California	30	0	3	33	110,374	1,083	604
Total United States	220	33	126	379	1,149,147	14,119	14,581
Total previous week	193	31	120	344			
Week ending October 24, 1942	167	41	107	315			

sidered doubtful by many geologists but it has been hoped that lower pays would extend into the area. If this prospect and the King County find reported last week pan out, almost one-third of the gap between North and West Texas production will be filled.

In Hardeman County, Texas, a showing of oil is reported in granite wash which also extends the North Texas area, this time to the northwest towards the Panhandle (p. 90).

From the standpoint of immediate importance, Mid-Continent's find in Cleveland County, Oklahoma (p. 99), outranks all others. If this discovery starts a new series of fields along the west flank of the Nemaha granite ridge, its importance can hardly be overestimated. Drilling is extending ino the Anadarko basin from the south, east and north. Finding of deep folds parallel to the Nemaha trend with prolific Wilcox production may make this area one of the most active in the country.

Of some significance is the finding of oil in the Hunton in Butler County, Nebraska, northwest of Lincoln (p. 98). The wildcat in which this oil was found has been shutdown for materials and has not been tested. However, the presence of oil far to the north of any production in the Salina basin offers possibilities for much development along the margins of that basin. The Butler County discovery is the first in Nebraska west of the Nemaha ridge.

Oil Discovery in Southwestern Florida Starts Lease Play of Major Proportions

MIAMI, Fla.—Full significance of the Florida discovery well drilled by Humble Oil & Refining Co. near Sunniland, Collier County, in the southwestern part of the state, still remains to be determined. However, there are several potentially significant features about the well which encountered production at 11,700 ft.

It established the presence of oil in a completely isolated location and may be expected to be followed by extensive exploration work on the part of other companies in an entirely new area. The well is the first to produce oil on the eastern seaboard and it is more than 500 miles from the nearest producing field.

It is possible that it is an extension of the Gulf Coast region of Texas and Louisiana. In this event the possibility of finding oil in the intervening states of Alabama and Georgia as well as Florida would be enhanced.

Sunniland, near which the well is located, is on Route 164 about midway between Everglades and La Belle. It is 40 miles southeast of Fort Myers, 80 miles northwest of Miami and about 40 miles southwest of Lake Okeechobee. Sunniland is in the Big Cypress swamp, part of the Everglades country.

Between 500 and 600 bbl. of oil have been swabbed from the well through the tubing. The oil is 20° A.P.I. gravity, solid black but unusually fluid for such a low gravity. It is similar to usual Gulf Coast oil. A fair volume of gas, believed sufficient to make it a flowing well, accompanied the oil.

Salt water was also encountered in the well but this is believed to have come from behind the casing. A thorough workover job will be required and it is probable that the well will be killed and the casing squeeze-cemented.

A heavy rig was used to drill the well. Operations were begun in the early part of this year. The first 6,000 ft. of hole were drilled through a highly porous, dolomitic limestone heavily saturated with water. This made it extremely difficult to maintain circulation and to obtain returns. Actual drilling was comparatively easy. Casing was run to the top of the sand and cemented before drilling in.

Because of the trouble encountered in maintaining circulation and the difficulties normally incident to the drilling of a wildcat, the cost of this well probably ran as high as $300,000. If, when this well is finally completed, it proves to be a commercial producer and other wells are drilled their cost should not be more than one-third that of the discovery well since drilling procedures will have been established.

Leasing

That the potential significance of the well is appreciated is shown by

DAILY AVERAGE PRODUCTION FOR WEEK

	Oct. 23 crude oil	Distillate, allied products	Oct. PAW quota all oils	Oct. 16 crude oil
Arkansas	78,400	4,000	81,700	78,365
California	785,750	46,000	832,000	788,650
Colorado	7,300	.....	7,000	7,045
Eastern fields	74,800	6,000	87,200	72,600
Illinois	224,700	11,500	219,500	235,950
Indiana	13,850	.....	13,800	14,150
Kansas	284,750	4,900	300,000	296,950
Kentucky	24,320	2,200	26,600	26,550
Louisiana	359,800	27,000	375,700	360,030
North Louisiana	80,800	.....	.....	81,030
Louisiana Gulf Coast	279,000	.....	.....	279,000
Michigan	54,400	100	59,100	55,100
Mississippi	47,000	.....	50,000	46,330
Montana	21,380	300	23,400	22,580
Nebraska	1,700	.....	1,800	1,750
New Mexico	112,200	5,400	116,600	109,300
Oklahoma	326,500	27,000	345,700	326,450
Texas	1,891,900	116,000	1,999,000	1,891,900
East Texas	368,700	.....	.....	368,700
West Texas	354,050	.....	.....	354,050
North Central Texas	138,300	.....	.....	138,300
East Central Texas	135,250	.....	.....	135,250
Texas Panhandle	88,100	.....	.....	88,100
Texas Gulf Coast	708,350	.....	.....	708,350
Southwest Texas	99,150	.....	.....	99,150
Wyoming	106,300	2,000	99,600	104,335
Total United States	4,415,000	252,000	4,638,700	4,438,035

Total production January 1-October 23, 1943 ..... 1,199,030,685 bbl.
Same period last year ..... 1,151,319,590 bbl.

the presence of other companies in Florida. Gulf Oil Corp., Superior Oil Co., Sun Oil Co., and others are reported to have substantial blocks of acreage leased up. In addition to a reported 40,000 to 50,000 acres around the Sunniland well, Humble is also said to have blocks aggregating 600,000 to 800,000 acres at various places in the state.

An interesting sidelight is contained in the fact that when some wildcat operations were under way in the state some years ago, a Florida law was passed awarding $50,000 in cash and 40,000 acres of state leases to those who drilled the state's first producing oil well. If Humble qualifies for the award it is reported that the money will be turned over to some state agency, possibly the university, and the state lands will be thrown open to independent operators.

In a statement issued by the Standard Oil Co. (New Jersey), parent company of Humble, Wallace Pratt, vice president and one of the country's leading geologists, said: "The successful completion of this well may even be taken as evidence of the possible extension of the rich Gulf Coast oil-producing region eastward through Alabama, Georgia and much of Florida. The Gulf of Mexico is the center of the greatest producing region in the Western Hemisphere today.

"The northern and western shores of the gulf, running from Corpus Christi, Tex., to southern Mississippi, have long been one of the most productive oil regions on the North American continent. Oil has been produced from wells far out into the gulf. For many years geologists have believed that the northeastern coast of the gulf and the states immediately adjacent to it also would ultimately produce oil, a possibility which would almost double the known oil-productive area in the Gulf Coast region. These beliefs have been strengthened by the discovery in Florida."

Leasing Reported in Eastern Maryland

SALISBURY, Md.—The search for oil to relieve the Eastern seaboard shortage turned Wednesday to Maryland's eastern shore, where one of the nation's large oil companies disclosed the leasing of some 30,000 acres of land and plans for leasing still more.

Byron M. Finch, in charge of land procurement for the Ohio Oil Co., said several hundred thousand more acres of land would be sought as a preliminary to exploration for oil in the coastal area.

A geologist has been conducting a preliminary survey in the region for several months.

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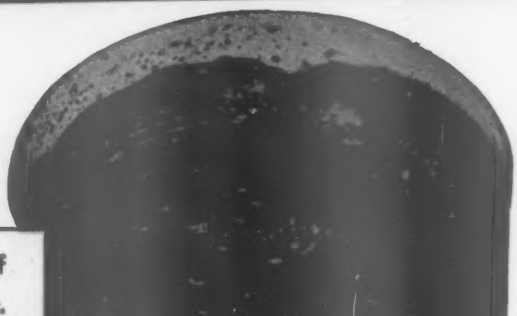

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CALIFORNIA

Paloma Development Getting Well Under Way

LOS ANGELES, Calif. — Two of the 15-well program authorized for the Paloma distillate field are nearing completion, two others are drilling and three more will be started in the near future. The development program now under way is related to the cycling plant which is scheduled for completion late this year or the first part of 1944.

Fresno County. — Superior Oil Co. has made location for a test to be drilled in 21-17s-18e on the Maxfield property, southeast of the Helm distillate field and west of a Miocene zone completion which Superior finished several months ago in the Lanare district in 22-17s-18e. About 4 miles north of Superior's discovery at Lanare and about 5 miles east of the Helm distillate field and 5 miles northwest of the Riverdale field, General Petroleum has landed pipe in 68-35 Burrel in 35-16n-18e preparatory to perforating for a production test of Miocene showings at 6,660 ft.

Raisin City. — Seaboard Oil Co., Union Oil Co., and Tide Water Associated Oil Co. should complete their second joint well in the West Raisin City field within the next 10 days if the oil sand found in the Miocene justifies a production test. In 14-15s-17e, Universal Consolidated Oil Co. has logged thin streaks of oil sand in the top of the Miocene and may test if enough streaks can be found close together. Edwin and Harold Pauley have spudded their test in 29-15s-18e, a short distance southeast of the East Raisin City field.

Kern County. — General Petroleum Corp.'s well, west of Bandini Petroleum Co.'s discovery west of the Round Mountain field, has been cased for a test of the upper Vedder zone of Miocene age which was topped at 2,508 ft. South of Bandini's discovery, Bender and Benwell have abandoned 1 S.P.L., 25-28s-28e.

LOS ANGELES BASIN

Los Angeles County.—Standard Oil Co. of California has decided to make a deep test in the eastern part of the Inglewood field. After landing pipe in 105 Baldwin-Cienega at 8,495 ft., drilling operations were resumed. No test was made of showings found just above the casing seat. Standard Oil Co. of Texas cored the Nodular at 6,793 ft. in 28 Rubel and should, therefore, reach the top of the Sentous zone of Miocene age within the next few hundred feet. Base of the Nodular was found at 6,924 ft. and at 7,500 ft. the formation is sand and shale. General Petroleum is the latest to enter the aggressive development program in the Wilmington field and has staked locations for seven new wells on the Ford and Terminal leases. The wells to be drilled on the Ford property will be directionally drilled and bottomed beneath the surface facilities which are being employed for other purposes. Union Pacific Railroad, with four strings of drilling tools in operation, has six additional derricks standing and nine locations staked.

Orange County.—Huntington Beach field operations have been stimulated by development of production in the Jones sand. Southwest Exploration Co. is preparing to drill five wells. Huntington State Co. completed its second producing well in the Jones sand and will have another test started within a week. The Jones sand is one of the few zones where operators can drill and expect to complete large wells. Holes located in the uplands along the ocean are drilled straight but do not show as large production as those bottomed in the tideland. Initials given recent completions in the tideland do not reflect the capacity of these wells as they are not allowed to establish large potentials.

Coastal District

Los Angeles County. — Standard of California recently abandoned 1-1 Frew in the SW¼ 29-3n-16w and has moved about 3,000 ft. northeast to drill 1-2 Frew which is about a mile west of nearest production in the Aliso Canyon field. Standard of California's first success in this field was the completion of 1 Sesnon, about 1 mile west of production previously developed by Tide Water Associated. This well failed to find upper-zone production but proved up a new zone in the Miocene. P. M. Girard has abandoned 1 Fisher-Wosk, 6-3n-16w, at 7,851 ft. when correlation showed the hole running almost 1,000 ft. lower structurally than the initial wildcat in this area.

Santa Barbara and Ventura Counties.—General Petroleum 27 Barnard, a recent completion, continues to be the surprise of the Ventura Avenue field with a pressure of 3,225 lb. on tubing and 3,425 lb. on casing. Pressure began building up in this well shortly after completion until the current level was reached. Union has suspended work on 60 Torrey in the Torrey Canyon district of Ventura County. This well was carried to 6,146 ft. and, failing to show anything, was plugged to 2,833 ft. where the sand was too depleted to produce.

In the Cat Canyon field, Standard of California is rigging up 2 Los Flores preliminary to redrilling the hole and deviating it toward the Miocene sand.

WILDCAT COMPLETIONS

Carbon Canyon wildcat district, San Bernardino County: Veta Grande Dev. Co. 2 McDermont, 5-3s-8w, abandoned, T.D 1,184 ft., no showings, bottomed in basement rocks.

EASTERN TEXAS

Smith County Paluxy Discovery Drilling Deeper

DALLAS, Tex. — Skelly Oil Co. 1 Chisum, T. Hawkins Survey, 2 miles southeast of Sand Flat was drilling ahead after showing enough oil in the Paluxy to assure opening a new field. Paluxy sand was topped at 6,945 ft., and a drill-stem test from 6,972-7,007 ft. showed 6,000 ft. of 24° A.P.I. oil in 90 minutes, with a steady blow of gas. The new well is 3 miles south of C. O. Wycliffe 1 Hackett, which also showed oil in Paluxy, but was deepened to 9,852 ft. and abandoned last July. The Skelly well ran over 250 ft. higher than the Wycliffe test, cutting a fault in the Georgetown. The new strike is 8 miles northwest of Chapel Hill pool, which has some wells producing from the Paluxy sand, and 6 miles south by west of Hawkins Woodbine sand pool, and 26 miles southeast of Quitman high-gravity Paluxy sand pool in Wood County. Sun Oil Co. has made location for 1 Alice Patterson near the new discovery, 660 ft. from south and east of 101.2-acre tract, or 2,800 ft. from east, 660 ft. from south, Felix Flores Survey.

Marion County.—Gulf Oil 1 J. D. Witt, Rufty Survey, western Marion County, showed some oil stains and odor in core taken from 7,300 ft., in Pettit lime, and was coring ahead.

Panola County.—W. C. Feazel and N. V. Kinsey 1 H. C. Jordan, west side of Carthage gas field, made an estimated flow of 100,000,000 cu. ft. of gas through perforations in lower Pettit lime from 5,989-6,015 ft. and was shut in. Continental Oil 1 Burnett, J. C. Chears Survey, took drill-stem test of the Travis Peak zone from 6,169-84 ft., open 15 minutes and recovered 60 ft. of mud with slight gas show.

WILDCAT COMPLETIONS

Houston County: Continental Oil 1 Robert Hall, 330 ft. from S, 1,100 ft. from W, 90-acre tract, 1 Lopez Sur., 3,975 ft. from N, 1,100 ft. from W of survey, elev. 185 ft., dry, stratigraphic test, T.D. 5,203 ft.

Hunt County: Stanolind Oil & Gas 1 W. M. Bickley, 330 ft. from N and E of tract, or 650 ft. from S, 330 ft. from E, J. M. Williams Sur., elev. 515 ft., Pecan Gap 1,330-60 ft., cut fault 2,490 ft., Eagleford 2,490-2,540 ft., Woodbine 3,090 ft., Paluxy 4,565 ft., dry, T.D. 4,696 ft.

Navarro County: John W. Hooser 1 Allbritton, 330 ft. from SE, 1,500 ft. from SW, or 700 ft. from NW, 1,500 ft. from SW, H.T.&B. Sur. 1, 3¼ mi. NW of Bazette, Pecan Gap 1,487 ft., Woodbine 2,878 ft., Georgetown 3,230 ft., dry, T.D. 3,241 ft.

Trinity County: American Liberty Oil Co. 1 Tom Morrison, 660 ft. from S and W, 160-acre tract, or 1,125 ft. from E, 660 ft. from S, W. M. Watson Sur., 6 mi. W and N of Apple Springs, dry, perf. 21 shots, 3,795-3,800 ft., T.D. 4,030 ft.

N. CENTRAL TEXAS

Hardeman County May Have First Oil Pool

WICHITA FALLS, Tex.—First oil production for Hardeman County was in progress at Humble Oil & Refining Co. 1 O. H. Dodson, Section 49, Block 10, H.&T.C. Ry. Survey, 3½ miles northwest of Chilicothe, which topped granite wash at 6,243 ft., with oil shows from 6,243-47 ft. A 45-minute drill-stem test from 6,496-6,512 ft. showed air immediately, and gas in 15 minutes, recovering 90 ft. of 44° gravity oil and 100 ft. oil-cut mud, with bottom-hole pressure of 1,300 lb. It was cored to 6,530 ft., and another drill-stem test from 6,498-6,530 ft. recovered gas, 60 ft. of oil and 170 ft. of drill mud, with bottom-hole pressure of 1,510 lb. The well was originally scheduled to test the Ellenburger, but is cementing casing to test. Nearest production is the Fargo pool, 14 miles due east, in Wilbarger County.

King County.—Second test for the new pool opened by Humble Oil & Refining Co. in King County has been staked, 1,905 ft. from the east line and 5,522 ft. from the south line of Section 101, Block A, J. B. Rector Survey, north of the discovery, No. 1 Edward W. Bateman. The discovery well was to be tested this week.

Young County.—Deep Rock Oil Co. 2 H. L. Morrison, McLaurin Survey, south of the Mississippi lime discovery, was disappointing in the Mississippi lime when oil was exhausted at 4,543 ft., and was being deepened to the Ellenburger.

Archer County.—Shallow pool for eastern Archer was in prospect at White & Duncan 1 R. C. Kinder, Section 62, Block 5, Clark & Plumb subdivision, when it flowed a solid stream of oil from sand at 1,242-50 ft. through 2-in. tubing. The oil was 42° A.P.I.

Throckmorton County.—Shell Oil Co. 1 Travis County, Travis County School Land Survey, north part of county, took a 45-minute drill-stem test from 5,160-5,220 ft., recovered 2,000 ft. of salt water, and was drilling ahead.

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WEST CENTRAL TEXAS

ABILENE, Tex.—A revival of oil activity in Coleman County is in prospect, with two new wildcat locations being staked during the past week, with two wells being staked in or near proven areas. Northern Ordnance 1 Lester West is a wildcat 7 miles west of Coleman, in NE NE NE Section 36, B.B.B.&C. Ry. Survey. Two miles west of Coleman, Hunter & Hunter have staked 1 B. Taylor, SE SW SW cor. Section 282, A. Jasson Survey, about 1,000 ft. northwest of some old wells showing gas and oil from about 2,600 ft. In Stephens County, Lone Star Gas Co. has made location for an Ellenburger test, SE NW Section 40, Block 7, T.&P. Ry. Survey, to be No. 2 Henry Compton. In Jones County the deep test of Great Lakes Carbon Co. 1 Humphries, south of Stamford, appeared a failure, and was shut down at a total depth of 5,250 ft. Another deep failure for the county was Hunter & Hunter 1-B Bert Fields, east of Hawley, which had dry Ellenburger at 4,980 ft. and was shut down for orders at a total depth of 5,156 ft.

WILDCAT COMPLETIONS

West Central Texas

Jones County: North American Oil, Consolidated, 1 W. A. Minter, 330 ft. from N and W, SE¼ Sec. 41, Blk. 15, T.&P. Ry. Sur., elev. 1,711 ft., dry, T.D. 2,507 ft.

North Texas

Archer County: Akin & Dimock 1 D. H. Skinner, 1,416 ft. from W, 1,341 ft. from S, Blk. 20, J. W. Harris Ranch subd., 8 mi. W Archer City, dry, T.D. 1,500 ft.

L. T. Burns 4 Frerich, 1,050 ft. from S, 1,000 ft. from W, Lot 6, Blk. 5, Clark & Plumb subd., dry, T.D. 1,230 ft.

S. F. Hutchison 1 A. D. DeMoss, 7,200 ft. from E, 1,180 ft. from S, Blk. 5, Lot 18, Clark & Plumb subd., dry, T.D. 1,100 ft.

McCarty & Coleman 1 W. H. Taylor, 330 ft. from N and E, Sec. 13, Blk. 17, A.T. N.C.L. Sur., flow 875 ft., Ellenburger dolomite pay 4,940 ft., T.D. 4,973 ft. Discovery.

W. C. Young 1 C. L. Abercrombie, 330 ft. from N, 700 ft. from E, Sec. 153, J. W.

Harris Ranch subd., dry, T.D. 1,285 ft.

Clay County: Consolidated Oil and L. T. Burns 1 Bryant Edwards, 6,480 ft. from N, 2,660 ft. from W, S. C. Beldon Sur., SW of Gant 1 Edwards dry hole, 5½ mi. E Henrietta, elev. 903 ft., Caddo 5,778 ft., Mississippi 5,992 ft., Ellenburger 6,040 ft., dry, T.D. 6,150 ft.

Cooke County: Magnolia Pet. 1 Presbyterian Church, Blk. 63, Fannin County School Land, semiwildcat, McGeorge area, dry, T.D. 6,656 ft.

Jack County: Standard Oil Co. of Texas and Hanlon-Buchanan, Inc. 1 S. C. Cooper, semiwildcat, Peek area, 190 ft. from S, 1,206 ft. from W, Sec. 3314, T.E.&L. Sur., dry, Caddo 4,569 ft., T.D. 5,003 ft.

SOUTHWEST TEXAS

Wildcatting Spurts Along Wilcox Trend

CORPUS CHRISTI, Tex.—The drilling boom which has been developing in the Southwest Texas district during recent weeks reached a new high last week, and the area is setting a fast pace which, so far, other parts of the state have been unable to equal. Last week's new starts total 50 wildcats and field tests, with wildcats showing a high percentage. Field development, as in other parts of the country, is hampered by restrictions and spacing rules imposed by the federal Government. Wildcat development is spiraling upward, and the Wilcox trend is the center of considerable new activity.

A new Wilcox sand was opened in the Nordheim field of De Witt County by Tide Water Associated Oil Co. 1 Huck, near the Karnes County line, and extends production about ½ mile southward. It was completed in perforations 8,104-24 ft. from a Wilcox sand logged at 8,110-40 ft., flowing gas and condensate on ⅛-in. choke and shut in without gaging. Shut-in pressures were 2,500 lb. on tubing and 2,650 lb. on casing, while flowing pressures show 1,750 lb. on tubing and 2,250 lb. on casing. Although all wells drilled so far in the field have cored this sand with gas-condensate showings, this is the first completion in the zone. This pay is 1,000 ft. below the regular 7,100-ft. field sand.

Starr County.—Continental Oil Co. abandoned the 1 Dallas Joint Stock Land Bank, northwest of the 1 Cameron discovery well at Cameron field, total depth 4,995 ft., definitely limiting the new field in that direction. Meantime, Stanolind is rigging up 1 Helena W. Lyons, about 2,000 ft. south of production, 330 ft. from the north line and 1,632 ft. from the west line of G.B.&C.N.G. Survey 225, on Saltmount farmout.

Willacy County.—A wildcat that is expected to be watched with considerable interest is Texas Co. 2 Yturria Brothers Land & Cattle Co., north edge of Willacy County, contracted to 12,000 ft. with Baldridge & King rigging up for early spudding. This wildcat is 1,980 ft. from the north line, 13,439 ft. from the west line and 17,650 ft. from the east line of Share 59, San Juan de Carricitos grant, on a 7,524.5-acre lease 8,317 ft. west-northwest of the 1 Yturria dry hole. It is located 3 miles east-northeast from Yturria and 8½ miles northeast of Raymondville.

Bee County.—Transwestern Oil and H. B. Zachry Co. 1 Holzmark estate, discovery well of the Voss-Foley Wilcox field, 1½ miles southeast of the Mineral field, flowed 2,000,000 ft. of gas per day with spray of condensate on ¼-in. choke, tubing pressure 2,750 lb., casing pressure 2,755 lb. from perforations at 8,300-10 ft., 72 shots. As the well had already shown for condensate in perforations at 8,530-40 ft., where it flowed 235,000 cu. ft. of gas and 10 bbl. of condensate daily on ⅛-in. choke, tubing pressure 1,000 lb., casing pressure 1,700 lb., it will probably be dual-completed.

Victoria County.—One of the best oil recoveries on drill-stem test on record was obtained by Superior Oil Corp. from the 1 Joe Sklar, southwest outpost test at the Placedo field in Victoria County. Test in perforations at 6,699-6,702 ft., open 10 minutes through ¼ and ⅜-in. chokes, recovered the entire drill stem full of pipeline oil, a total of 39 bbl., with 580 lb. working pressure at top, 2,700 lb. bottom-hole pressure. This is a new pay sand for the Placedo field.

WILDCAT COMPLETIONS
Lower Gulf Coast

Bee County: Rodney De Lange 1 Union

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Central Life Ins. Co., 4½ mi. SSW of Skidmore, dry at 5,455 ft.

Jim Wells County: H. R. Smith and H. J. Mosser 1 Pablo Perez, 3½ mi. N of Alice, dry at 5,365 ft.

H. F. Wilcox Oil & Gas Co. 1 Elizabeth Almond Price, 2 mi. W of Alfred field, dry at 5,017 ft.

Nueces County: Sinclair Prairie Oil Co. 1 John H. Shary, 2½ mi. WSW of Robstown, dry at 8,035 ft.

Willacy County: Texas Co. 1 Yturria Bros. Land & Cattle Co., 4 mi. ENE of Yturria, dry at 8,515 ft.

South Central Texas

Dimmitt County: W. J. Walton and Freeman P. Galt 1 Julia K. Frost, 4 mi. WNW of Carrizo Springs, dry at 2,390 ft.

South Texas

Starr County: Lockhart & Davenport 3 Domingo L. Garza, 1,320 ft. NW of Garza gas discovery near Lockhart field, dry at 4,045 ft.

TEXAS GULF COAST

Discoveries Gaged in Liberty and Jackson Counties

HOUSTON, Tex.—Gaging of William Helis 1 Hirsch estate,, discovery well about 7 miles southeast of Devers in Liberty County, highlighted the week's news in the Texas upper Gulf Coast district. Drilled "tight" the test had been the center of interest since reports were circulated that it had picked up an oil-bearing sand and had built tanks for completion after setting casing. Perforated at 7,704-10 ft., it made a potential of 92 bbl. daily through 7/64-in. choke, tubing pressure 500 lb., low gas-oil ratio of 168:1, no water, gravity of the oil 26.3. Total depth is 8,205 ft., 5½-in. casing set 8,078 ft., 2½-in. tubing at 7,685 ft.

Another discovery gaged last week was W. L. Pickens 1 John Kramer, opening the East Mauritz field in Jackson County, 6,000 ft. east-southeast of the Mauritz field. It flowed 150 bbl. daily on 7/64-in. choke, tubing pressure 860 lb., casing sealed, from perforations at 5,703-09 ft. in the Frio sand. Sand was logged from 5,696-5,704 ft.

A triple completion was recorded at Lake Creek field in Montgomery, second in the field in recent months. This new triple-sand producer is the Superior Oil Co. of California 7-A McWhorter et al, T. J. Nichols Survey A-397, but one sand, at 9,185-9,200 ft., is shut in pending Railroad Commission hearing. Completion from the other two sands showed: "E" sand perforated 10,992-11,022 ft., potential 150 bbl., ¼-in. choke, 1,434,000 ft. of gas, gas-oil ratio 7,570:1, tubing pressure 1,550 lb., gravity 46.9; "B" sand perforated 9,734-54 ft., potential 138 bbl., ¼-in. choke, 1,254,000 ft. of gas, gas-oil ratio 9,100:1, casing pressure 1,550 lb., gravity 53. Total depth is 11,843 ft.

Chambers County.—The Salt Dome Oil Co. et al are preparing to go back into the 1 Mrs. Dulce Ogden, in Lot 4, Evan Douthit Survey A-329, at South Anahuac, to deepen it to 9,500 ft. Original total depth was 8,149 ft., with the well completed in October 1938 as a gas-condensate-water producer from perforations at 7,515-25 ft. and later shut in.

Jefferson County.—Rowan Drilling Co. 1 L. B. Broussard is being watched with considerable interest as it prepares to test a sand at 8,540-71 ft., which carried indications of oil production in side-wall samples. Total depth is 8,736 ft., where it had a water flow which caused electric log to be inconclusive so side-wall samples were taken. The 5½-in. casing is set to 8,600 ft., shutting off the bottom-hole water.

Fort Bend County.—Providence Oil Co. 1 Hubert-Thorpe et al unit, in John Brock Survey A-110, at Clodine, topped sand at 7,472 ft., found it to be all-gas column with oil sand shaled out. Total depth is 7,507 ft. Operator has applied for permit to deviate the hole and bottom it at 330 ft. from the west line of the lease. Present bottom of the hole is 467 ft. from the west line. Offset operators are reported to have agreed to this plan.

WILDCAT COMPLETIONS

Galveston County: Pan American Production Co. 2 R. B. Peters, NE of production at SE Gillock, dry at 9,375 ft. in sidetracked hole.

Trinity County: American Liberty Oil Co. 1 Tom H. Morrison, 4 mi. NW of Apple Springs, dry at 4,030 ft.

Liberty County: William Helis 1 Hirsch estate, T.&N.O. Sur., Sec. 27, 7 mi. SE of Devers, T.D. 8,205 ft., perforated 7,704-10 ft., 92 bbl. day, 7/64-in. choke, T.P. 550 lb., gas-oil ratio 168 : 1, gravity 26.3, no water.

MICHIGAN

Newaygo County Well Makes Good Flow

SAGINAW, Mich.—Newaygo County's Goodwell Township oil field served to bolster Michigan's dwindling production with the completion last week of Pure Oil Co. 2 Harris in Section 8. The well, 2,784 ft. deep, flowed 108 bbl. the first hour.

Only eight completions were recorded, one of them being a deep-test wildcat production, another a 40-bbl. well in Bay County's Monitor Township and the rest dry holes, all in proven territory.

In Mecosta's Fork Township field, Mogul Oil Co. 1 Murray was dry at 3,863 ft. Other dry holes were recorded in Osceola's Rose Lake section, Akron Township of Tuscola County and in the Bangor field of Van Buren County.

The state Conservation Department issued 16 additional drilling permits for tests in 10 counties to bring the permit total for the year to an even 500, three going to Osceola County, three to Arenac, two to Mecosta, two to Van Buren, one each to Clare, Lake, Allegan, Isabella, Lapeer and Montcalm.

Enterprise Township, Missaukee County: Sun 1 E. C. Wilson et al, S½ SE SE 11-23n-5w, 31 bbl. at 4,595 ft.

CANADIAN FIELDS

Deepest Canadian Test Finds Little in Madison Lime

CHATHAM, Ont. — Shell Exploration-Norman 1, LSD 5, 22-24-5w5, on the Jumping Pound structure, is below 11,833 ft. after drilling 245 ft. in the Madison limestone on Canada's deepest well. Only thin streaks of porous limestone have been met, though the Madison in Turner Valley has a porous pay about 80 ft. in. The test will be continued 250 ft. more if necessary.

Vermilion. — R. C. Vaughan, chairman and president, with a group of other officials of the Canadian National Railways, recently inspected operations of Cannar Oils, a C.N.R. subsidiary, in the Vermilion field of eastern Alberta. The company controls 620 acres and has completed 20 of a planned 50 wells, with 10 now producing an aggregate of 350 bbl. daily. Other operations are producing, according to a statement of Mr. Vaughan, and the C.N.R. is taking the entire output of the Vermilion Consolidated treating plant at Borrodaile. The producing sands are between 1,800 and 1,900 ft. J. W. Penney is manager of Cannar Oils. Discussing the operations, Mr. Vaughan said: "We are opening the wells as a wartime measure of precaution to secure an adequate supply and reserve of fuel oil for the railways' western services. Operation in British Columbia and Alberta is, at present, largely dependent on fuel oil supplies brought through Pacific Coast ports, and any interruption to this supply would seriously disrupt our service. Bituminous coal is so scarce that it is impossible to use it as a substitute for oil. At present levels of traffic, fuel requirements of the Canadian National in Western Canada are 1,050,000 bbl. a year."

Prince Edward Island.—In the province of Prince Edward Island, Cities Service Co. and Socony Vacuum Co. have started a joint test in the bed of Hillsboro Bay, in Northumberland Straits, which separate the island from Nova Scotia. Cribs have been set up in the water, varying from 16 to 24 ft. according to the tide, and a 146-ft. steel derrick with equipment capable of drilling 14,000 ft. is being used. The oil horizon is expected around 10,600 ft. The only two previ-

ous tests in Prince Edward Island were drilled on Governor's Island in Hillsboro Bay about 17 years ago, the first being abandoned at shallow depth and the second at 5,970 ft. This is the first time that drilling has been undertaken in salt water on either Canadian coast.

PERMIAN BASIN

New Field May Be Opened East of Slaughter

MIDLAND, Tex. — Woodley Petroleum Co. 1 Harless, NW NW Section 21, Block A, R. M. Thompson Survey, eastern Hockley County wildcat, indicated possibility of opening a new field 22 miles northwest of Slaughter field when it was showing oil from core and cuttings from a total depth of 5,939 ft., and operators were running 5½-in. casing to make a test. First show of oil in the test came at 5,860 ft., with additional shows down the hole, and a core from 5,930-39 ft. recovered 5 ft. of good core, with cuttings showing saturation and good porosity, enough to warrant running casing. The zone is tentatively identified as the Holt pay of the Permian, usually found about 1,000 ft. below the San Andres zone, producing at Slaughter. Globe Oil & Refining Co. had asked contractors for bids to drill the block it has recently assembled 5 miles northeast of Levelland on which it intends to test the Clear Fork to about 6,500 ft. Brown & Wheeler 1 Earl French, north of Levelland, was nearing the zone in which Helmerich & Payne 1 Whiteface indicated possible production in drilling to 4,796 ft.

Upton County.—Texas Pacific Coal & Oil Co. 51 Lane, deep test in the McCamey pool, set 5½-in. casing at 8,358 ft. in Ellenburger, and will perforate to test the encouraging shows encountered. The last drill-stem test, from 8,297-8,358 ft., showed water, but previous tests had shown oil.

Winkler County.—Magnolia Petroleum 21 State-Walton, in Kermit Ellenburger pool, which last week encountered gas in the Devonian chert at 8,273 ft., recovered 8 bbl. 56-gravity distillate from 8,273-81 ft. The well was drilling below 8,304 ft., still in chert.

Andrews County. — Mid-Continent Petroleum Corp. 1-B University, new pool opener southeast of Fullerton pool, was drilling ahead after acid treatment from 7,110-77 ft. did not improve the well due to leaking packer.

Winkler County: Indicating that the Holt pay of the Clear Fork lime is a blanket formation underlying the Keystone shallow pay, Sinclair Prairie Oil Co. 4-A Walton, Ellenburger

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test ¾ mile northwest of Ellenburger discovery and 1¼ miles northwest of the Holt discovery, on 1-hour drill-stem test of the section from 4,697-4,737 ft., had steady blow of air and recovered 150 ft. of oil-cut mud with some gas.

WILDCAT COMPLETIONS

Cochran County: Helmerich & Payne 1 M. L. Slaughter, 660 ft. from N and E, Lab. 1, Lge. 116, C. A. Pierce subd. No. 2, Potter County School Land, elev. 3,794 ft., dry, T.D. 5,213 ft.

Sunray Oil 1 D. C. Reed, 660 ft. from S, 1,980 ft. from W, Sec. 57, Harrison-Brown subd., elev. 3,841 ft., San Andres 4,310 ft., S.S.O., dry, T.D. 5,250 ft.

Pecos County: Choate & Brown 1 Barnes-State, 660 ft. from NE and SE Sec. 132, Blk. 10, H.&G.N. Ry. Sur., dry, T.D. 1,475 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M. — Attempt to plug off water and complete from Yates dolomite, which showed oil from 4,064-4,108 ft., will be made at Skelly Oil Co. 1-U State, Section 5-22s-35e, 5 miles west of South Eunice pool, western Lea County. The test drilled to a total depth of 4,188 ft., getting water at 4,180 ft. After plugging back to shut off the water, the pay section will be shot in an effort to successfully complete the wildcat as a producer. Steel-line measurement corrected top of pay to 4,064 ft. from previously reported top of 4,055 ft.

Humble Oil & Refining 1 Federal-Leonard, 12-26s-37e, Ellenburger project, reported a show of oil while drilling at 7,118 ft., and was preparing to take a core. The show is probably in the Clear Fork lime.

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LOUISIANA GULF

Drilling Activity on Increase With 18 Starts

NEW ORLEANS, La.—General increase in new work was recorded in the Louisiana Gulf Coast area during the past week, with 18 new starts reported.

Plaquemines Parish. — Tide Water Associated Oil Co. 24 Buras Levee district, 34-21s-30e, at Venice field, was completed flowing 258 bbl. per day on ⅛-in. choke from perforations at 10,986-11,012 ft., gas-oil ratio 950:1, tubing pressure 800 lb., casing sealed. Total depth is 1,253 ft., 5½-in. casing set at 1,250 ft. Test at 11,062-90 ft. had recovered dry gas and was shut off.

Evangeline Parish. — On the Reddell prospect, Continental and Humble are running a new test in the Wilcox zone while no definite completion has been reported from the Danciger et al test, the 1 Hattie Haas. Both are testing deep levels in the Wilcox zone. Pan American Producing Co. has drilled plug in the 3 Crowell Land & Mineral Corp., 35-3s-1w, north of west-flank Wilcox production at Pine Prairie, and is preparing to test Wilcox sands. Total depth is 10,693 ft., 7-in. casing set at 10,590 ft. Gulf Refining Co. 1 Chapman-Miller unit, 2-4s-1w, Wilcox test on south flank of the Pine Prairie dome, is drilling below 6,500 ft. The Texas Co. and Humble spudded 1 Stewart-Ledanois Land & Stone Co., 35-3s-1w, on west flank, and is drilling below 2,500 ft. in sand and shale.

APPALACHIAN FIELDS

Three West Virginia Wildcats in Deep Horizons

PITTSBURGH, Pa. — In Dry Fork district, Tucker County, Ohio Oil Co.'s test on the Kaemmerling tract is drilling at a depth of 7,831 ft. in black shale (Marcellus). It was at first believed the casing set at 7,777 ft. was in the Onondaga chert but subsequent samples failed to verify it.

Gilmer County.—In Center district, Gilmer County, Hope Natural Gas Co., wildcat deep test on the Susan Stump farm passed through the Oriskany sand from 6,081-6,133 ft. It is now drilling at 6,213 ft.

Boone County.—In Peytona district,

Boone County, Owens, Libby-Owens 37-656 Coal River Mining Co. is drilling very slowly in the White Medina at 5,537 ft.

OHIO, KENTUCKY

New Gas Pool Indicated in Knox Twp., Holmes County

ZANESVILLE, Ohio.—A 2,000,000-cu. ft. gas well was completed in the West Zanesville pool by Brendal Production Corp. on the Hal Everett tract. The well was completed 12 ft. in the sand at 3,463 ft. and turned in the line. It will be drilled to the oil pay later. The Preston Oil Co. completed a small oil well in the same pool on the Bell Minnish tract. The Clinton, found at 3,493-3,532 ft., was badly broken.

The Preston Oil Co. is drilling-in a well on the Blackstone tract in Section 9, Salt Creek Township, Muskingum County, with a good showing of oil. The well was shut down in the sand after drilling hard Clinton from 4,159-90 ft.

A new gas pool is indicated by the Ohio Fuel completion on the Spreng tract in Section 21, Knox Township, Holmes County. The well, ½ mile south of a small producer, found 50 ft. of Clinton sand at 3,015-65 ft., and gaged 977,000 cu. ft. of gas with a rock pressure of 1,160 lb.

OHIO WILDCAT COMPLETIONS

Laurence County, Aid Township: David Fox 1 W. F. Thompson, Sec. 7, Clinton, 3,124-36 ft., T.D. 3,169 ft.

Morgan County, Bristol Township: Industrial Gas 1 Richardson, Sec. 6, Clinton, 4,715-65 ft., dry, Medina 4,826-41, dry, T.D. 4,846 ft.

Muskingum County, Harrison Township: Ohio Power 1 fee, Sec. 10, Clinton 3,842-87, dry, T.D. 4,000 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—Two oil wells and six dry holes comprised western Kentucky's crop of completions during the week. The best of the completions was a 175-bbl. well in Webster County, White et al 2 H. Z. Clark, near the town of Clay, completed in Palestine sand at 1,185-1,202 ft.

C. Woods and W. F. Lacey have a promising well in a wildcat on the Bauldorf farm, 4 miles northwest of Geneva, Henderson County. It showed good saturation in Tar Springs sand at 1,874-89 ft., in a coring test. A drill-stem test developed 175 ft. of oil and 25 ft. of oil-cut mud.

WESTERN KENTUCKY WILDCAT OPERATIONS

Henderson County: C. D. Burbank 2 fee, 1½ mi. SE of Smith Mills pool, dry at 2,872 ft., Glen Dean 2,127 ft., Ste. Genevieve 2,700 ft., St. Louis 2,865 ft.

Paul Maier and Ryan Oil 1 Bauldorf Bros., 3 mi. NE of Henderson, dry at 2,516 ft., lower Menard 1,602 ft., Cypress 2,079 ft., Ste. Genevieve 2,369 ft.,

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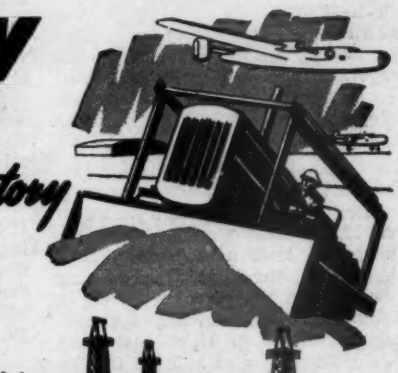

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McClosky 2,450 ft., St. Louis 2,506 ft.

McLean County: Kingwood 1 A. M. Whitmer, 2 mi. S of Sacramento, dry at 2,558 ft., upper Glen Dean 1,832 ft., Bethel 2,160 ft., Ste. Genevieve 2,244 ft., McClosky 2,366-71 ft.

Daviess County: Bennett Bros. and A. C. Thomas 1 Lafe Stevens, 4 mi. E of Knottsville, dry at 1,070 ft.

Union County: Sohio, Basin Drilling and Evans 1 B. Boswell, 3 mi. NW of Spring Grove, pumped 60 bbl., Aux Vases sand at 2,736-62 ft., shot, T.D. 2,854 ft.

ROCKY MOUNTAIN

Revival of Old Utah Field May Follow Lease Sales

DENVER, Colo.—The recent sale of oil and gas leases on 4,400 acres of federal Government land on the Cisco structure in Grand County, Utah, at the district land office at Salt Lake City, has paved the way for the revival of an old field and the drilling of exploratory wells to heretofore untested deeper horizons. The leases were offered in eight separate parcels. The Union Oil Co. of California was high bidder at $3 per acre on Parcels 2 and 3, consisting of 1,120 acres in Sections 3, 4, 9 and 10-20s-21e, and the Mountain Fuel Supply Co. was high bidder on the other six parcels comprising 3,280 acres in Sections 3, 10, 22, 26 and 27-20-22; 20, 29, 30 and 31-20-22; and 5 and 6-21-22. The bids on these parcels ranged from $3 to $3.60 an acre. The terms of the sale require that the acreage be placed in the unit upon which an agreement was approved by the Secretary of the Interior on June 2, 1942.

The Cisco structure, which lies just to the west of the Colorado boundary, comprises an area of 13,500 acres, of which 12,000 acres were vacant public land and 1,460 acres state school land. In 1924, the Utah Oil Refining Co. brought in the discovery well in SE NE 25-20s-21e, making approximately 90,000,000 cu. ft. of gas a day from the Dakota sand at 1,950 ft. The well caught fire and burned for some time. When the fire was extinguished, the flow of gas had dropped to 10,000,000 cu. ft. a day. An extensive drilling campaign followed during the next three years and the Crystal Carbon Co. built a carbon plant to utilize the gas. The plant was dismantled in 1935, the pressure having gone down, and in 1936 the wells were plugged and abandoned with one exception. This well was capped for observation purposes, and the United States Geological Survey made periodical inspections. These showed that the gas was gradually building up pressure again and indicated that the supply in the Dakota might be commercial. The field never has been tested below the Dakota except in one well drilled in 1925 in 30-20s-22e by the Utah Oil Refining Co., which went into the Todilto sand of Jurassic age, probably the equivalent of the Sundance in Wyoming, at 3,045 ft. Subsequent to the drilling of this test oil has been found in the Pennsylvanian formation at Rangely, 80 miles to the north and east, and in the Rattlesnake field in northwest New Mexico.

Continental Discovery at Gebo.—The Continental Oil Co. discovery on the Gebo dome, Hot Springs County, Wyoming, reported last week, which drilled 107 ft. of saturated Embar lime, and was estimated unofficially as capable of making upward of 5,000 bbl. a day, has resumed drilling to go to the Tensleep horizon and was making hole at last reports at 5,033 ft. in lime and anhydrite. Additional saturation in the Embar was reported at 4,859-4,912 ft., but no drill-stem test was reported.

MONTANA WILDCAT COMPLETION

Pondera Block, Pondera County: Northern Ordnance, Inc., 1 State, C NE SE 9-28n-6w, T. D. 3,115 ft., stopped in Ribbon sand, plugged and abandoned.

ILLINOIS

Five New Producing Spots Opened During Week

MATTOON, Ill.—Five new producing spots were opened in Illinois in the past week in Wayne, Clay, Jefferson, Madison and Monroe counties.

Cities Service Co. deepened its 1 Vaught, C W½ SW NW 33-2s-9e, in the Barnhill pool, Wayne County, with good results. It had been completed at a total depth of 3,303 ft. with an initial production of 209 bbl. It fell off to 100 bbl. a day. Deepening it to 3,329 ft. increased the production to 648 bbl. per day, natural flow. Fredonia lime was topped at 3,313 ft. and McClosky lay at 3,317-29 ft.

Texas Co. completed a 428-bbl. well in the Blairsville pool, Hamilton County. No. 2 Drew Community, SW NE NW 20-4s-7e, found pay in Aux Vases sand at 3,275-84 and 3,287-3,303 ft., which was shot.

The best of several Dale-Hoodville, Hamilton County, pool completions was Shell Oil Co., Inc. 5 G. W. Morris, NE NW SE 19-6s-7e, which pumped and flowed 774 bbl. per day from Tar Springs sand at 2,373-2,401 ft.

Gulf Refining Co. completed two dry-hole offsets to the discovery well of the North Markham City pool in Jefferson County. Gulf 1 H. A. Wood, C NE SW 13-2s-4e, was dry at 3,150 ft. and 2 H. A. Wood, C SW SW 13-2s-4e, was a failure at 3,129 ft. Gulf's 1 Stahler, NW NE NE 23-1s-4e, in Jefferson County, located over a mile from other production, swabbed 60 bbl. of oil and 2 bbl. of water in 8 hours from McClosky lime at 2,916 ft. and the company's 2 Dollie McNail, C NW SW 23-1s-4e, offsetting the discovery well in Farrington Township, Jefferson County, was close to completion depth with McClosky lime topped at 2,880 ft.

In the Bogata pool in Jasper County, Gulf Refining Co. completed a 515-bbl. initial producer, 1 Mark Heap, SE NE SW 28-6n-9e, in McClosky lime at 3,106-16 ft. Total depth was 3,126 ft.

The recently opened Exchange pool in Marion County was partly defined by Magnolia Petroleum Co. 1 E. White, C SW NE 25-1n-3e, which was dry at 2,830 ft., with McClosky lime at 2,753-57 ft.

National Associated Petroleum Co. 1 York-Hibbs, NE NW NW 35-4s-7e, in Bungay field, Hamilton County, flowed 600 bbl. in 24 hours, cut 2 to 3 per cent by water. The pay is Aux Vases sand at 3,303-13 ft. The well quit flowing and was being put on the pump.

Washburne & Powers opened a pool in Wayne County with 1 L. C. Jordan, SE SE NW 34-2n-7e. It pumped 230 bbl. in 24 hours from Aux Vases sand at 2,961-68 ft., which had been shot. Total depth, 2,979 ft.

Bell Brothers, of Robinson, Ill., opened a pool in Jefferson County with 1 Indiana National Bank, C E½ NE NE 24-1s-3e. The well flowed 379 bbl. the first 18 hours from McClosky lime at 2,778 ft. but on the pump made 264 bbl. in 24 hours.

WILDCAT COMPLETIONS

Clay County: McBride 1 L. Woodridge, SE NE SW 22-5n-5e, pumped 22 bbl. oil, 52 bbl. water, Aux Vases sand 2,364-80 ft., shot., T.D. 2,531 ft., P.B. to 2,371 ft.

Jackson County: Wiser 1 Jackson County Coal, C S½ SW SW 22-7s-1w, dry at 2,332 ft., upper Kincaid 1,274 ft., Cypress 1,895 ft., no Benoist sand, Aux Vases 2,110 ft., McClosky 2,244-48 ft.

Jasper County: Helmerich & Payne 1 R. J. Hines, SW SW SE 3-5n-10e, dry at 2,980 ft., Vienna 2,210 ft., Cypres 2,487 ft., Benoist 2,691 ft., Aux Vases 2,780 ft., Fredonia 2,867 ft.

Jefferson County: Bell Brothers 1 Indiana National Bank, C E½ NE NE 24-1s-3e, pumped 264 bbl., McClosky lime at 2,778-82 ft. and 2,860-69 ft., acidized. The well flowed 379 bbl .the first 18 hr. before the 24-hr. test on the pump.

Madison County: Eason 1 Rence, SE NE NE 16-4n-6w, 168 bbl. of oil, 103 bbl. water, Devonian lime top 1,705 ft., pay at 1-757-67 ft., acidized, T.D. 1,772 ft.

Monroe County: Charles McLaughlin 1 Hersch, SW cor. NE NW SE 11-2s-10w, Trenton lime 453-81 ft., acidized and pumped 17 bbl. oil, 50 bbl. water; T.D. 491 ft. Extends Plainview pool.

Shelby County: E. J. Bergenthal 1 Scheef heirs, NE NE SE 21-10n-5e, dry at 1,991 ft., Benoist sand 1,939-54 ft., Aux Vases 1,978-82 ft., shot at 1,988-91 ft.

Wayne County: J. P. Washburn & Powers 1 L. C. Jordan, SE SE NW 34-2n-7e, pumped 230 bbl., Aux Vases sand 2,961-68 ft., shot, T.D. 2,977 ft.

White County: Gulf Refining Co. 1 M. E. Connery, SE SE NW 1-5s-8e, dry at 3,350 ft., swabbed 70 gal. oil and 100 bbl. water in 8 hr. in test at 3,192-3,205 ft.

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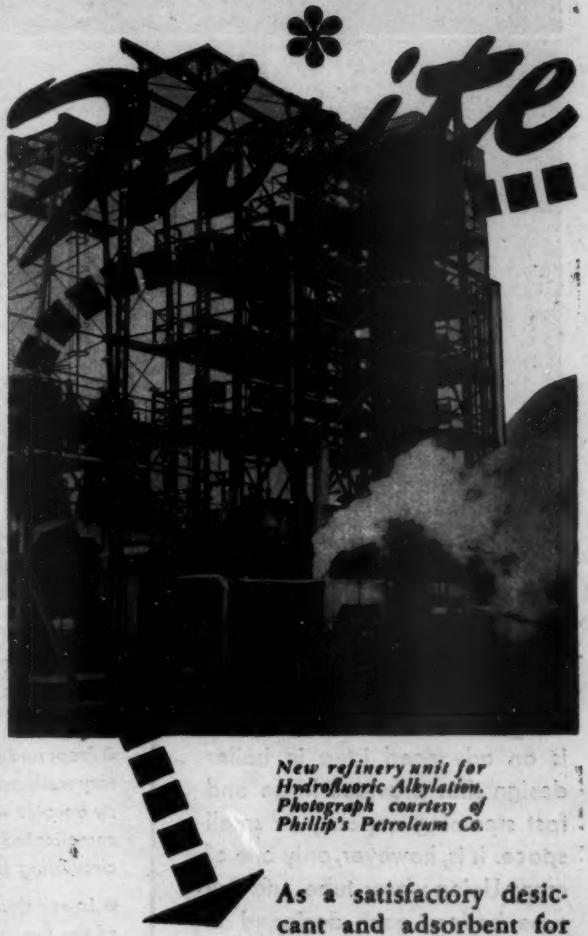

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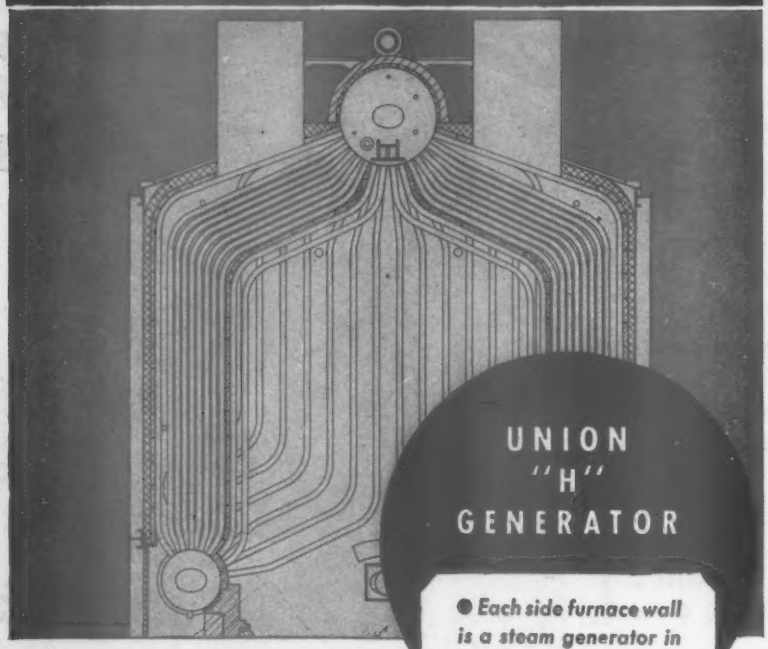

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KANSAS

Wildcat Showings in Kingman, Sumner And Rooks Counties

THREE tests in Gove, Sumner and Kingman counties, Kansas, were attracting attention at the close of the week in review. In Gove County, Globe Refining Co. 1 Snyder, SE SE SE 8-14s-29w, found Viola lime at 4,425-30 ft. A drill-stem test of 1 hour developed 40 ft. of oil-cut mud. Bottom-hole pressure was 2,400 lb.

In Sumner County Barnsdall Oil Co. 1 Gilbert, SE SE NW 35-30s-1e, topped Mississippi lime at 3,303 ft. There was a good stain in the cuttings. The crew was drilling at 3,500 ft.

In Kingman County Vickers Petroleum Co. 1 Rolls, SW cor. NW 8-30s-8w, found Mississippi lime at 4,163 ft. A 10-minute drill-stem test at 4,165-4,202 ft. developed 90 ft. of gas-cut mud. The well was drilling at 4,320 ft., with a gas showing of between 750,000 and 1,000,000 cu. ft.

Twenty-one new wells and five dry holes were reported in the state during the week.

KANSAS WILDCAT COMPLETIONS

Rooks County: Nelson et al 1 Griffin, C NE NE 25-8s-16w, dry at 3,710 ft., Stone Corral 1,270 ft., Dodge City 3,165 ft., Kansas City 3,190 ft., Arbuckle 3,622 ft.

Russell County: Ingling & Parker 1 Marshall, C NE NW 20-13s-11w, dry at 3,447 ft., Stone Corral 630 ft., Viola 3,321 ft., Simpson 3,360 ft., Arbuckle 3,417 ft.

Stafford County: Marlyn Oil 1 Sittner, SW cor. NW 4-22s-12w, dry at 3,685 ft., Dodge City 3,307 ft., Kansas City 3,326 ft., base of K.C. lime 3,550 ft., Viola 3,600 ft., Simpson 3,627 ft., Arbuckle 3,673 ft.

Pratt County: Pryor & Lockhart and Aladdin 1 Barnes, NE cor. 25-27-14w, dry at 82 st., Stone Corral 817 ft., Kansas City 3,980 ft., Viola 4,354 ft., Simpson 4,442 ft., Arbuckle 4,542 ft.

Brown County: Gall & Towle 1 Dellaplain, C SW NE 5-4s-15e, dry at 3,045 ft., Kansas City 1,237 ft., Mississippi 2,561 ft., Hunton 2,994 ft.

FOREST CITY BASIN

ST. JOSEPH, Mo.—Cities Service 2 Cook, southeast offset to No. 1 in the Tarkio pool of Atchison County, Missouri, went into the Bartlesville sand at 1,392 ft., 10 ft. higher on structure, and the company immediately set and cemented casing. There was good saturation in the top of the sand. The well is in SE NW NW 32-65n-39w, and is expected to be better than 1 Cook, which was the first Bartlesville producer, and the first deep-zone producer for Missouri,

Fletcher E. Hunt has reached Devonian lime at his 1 E. A. Moncelle wildcat test in SW SE 26-78n-29w, Dallas County, Iowa, north of Redfield. The old J. A. Johnson 1 R. E. Lucas in SW NE SE 28-70n-43w, Fremont County, Iowa, near Thurman, is being

deepened. It had been shut down more than a year at total depth of 1,883 ft. Hunton lime was topped at 1,095 ft.

MISSOURI WILDCAT COMPLETIONS

Atchinson County: O. R. Newcomer et al 1 Lassell, NW SW NW 8-64n-39w, dry at 1,411 ft., Bethany Falls lime at 833 ft.
Bates County: Julian et al 1 Brannon, NW

Butler County, Nebraska, Test Shows Oil in Hunton

BELLWOOD, Neb.—The first substantial oil showing in Nebraska outside of Richardson County, was developed in a wildcat test in Butler County about 110 miles northwest of the four pools in Richardson County.

Bellwood Syndicate, Ltd., 1 Nicholas, SE NW 29-16n-2e, topped Hunton lime at 1,360 ft. Eight-inch pipe was set at 1,374 ft. and drilling continued to 1,530 ft. The hole began filling at 1,503 ft. and oil rose 1,500 ft. Operations were shut down to await the arrival of material. C. M. Turner of Wichita has been in charge of the drilling of this test.

OKLAHOMA

Important Discovery Seen in Cleveland County Wildcat

BIG news of the week, and probably of the year, is Mid-Continent's discovery west of the Moore field in Cleveland County. The well, which started one of the most active buying campaigns in recent years, is 1 Edgar Harris, NE SE SW 29-10n-3w. On a drill-stem test, the well flowed from the second Wilcox sand from 8,780-92 ft., and although the results were not given out by the company, was estimated to be anything from a 5,000-bbl. well up.

Tops reported in the Harris well are as follows: Layton 5,930 ft., Checkerboard lime 6,340 ft., Oswego lime 7,475 ft., Woodford chert 7,900 ft., Hunton lime 7,955 ft., Sylvan shale 8,290 ft., Viola lime 8,360 ft., Simpson dolomite 8,534 ft., second Wilcox 8,780 ft. The first Wilcox was missing. Cores were taken at 8,782-87 and 8,787-92 ft. The first recovered 4 ft. of sand with a gas odor, the second recovered 3 ft. of soft saturated sand. Nine-inch casing has been set to 1,218 ft. and an oil string will be set to the top of the sand. The well will probably not be completed for another week.

The well proves the existence of a structure which was found by seismograph about 8 miles west of the Moore field. The pay in the new field is about 1,300 ft. lower than at Moore, showing that structures are steep. Comments as to the significance of the new field are speculative, but the new structure is outlined with a northwest-southeast trend. The pays in West Edmond pool, about 4 miles west of Edmond, also lie at a lower level than at Edmond. Between the two producing areas, Youngblood 1 Swatek, NW SW 7-11-4w, is in the Hunton and is looking for the Viola below 8,200 ft., which places this well on a corresponding level. It therefore appears as if there is sharp secondary trend paralleling the main Nemaha buried ridge. This opens up possibilities for new production all along the line of fields along the main trend.

Gutowsky 1 Watson, SE SE SW 23-14-5w, on the west edge of the West Edmond pool and in Canadian County limits that field to the west in the Hunton and is testing the Oswego at latest reports.

OKLAHOMA WILDCAT COMPLETIONS

Comanche County: Texas Co. 1 School Land, SW cor. 16-4n-10w, dry at 4,602 ft.
Kay County: Tide Water 1 Burks, NE SW SE 21-28n-1w, dry at 3,742 ft., Layton 2,793 ft. Misener 3,515 ft., Wilcox 3,518 ft.
Noble County: Sinclair Prairie 1 Bradbury, NE SE NW 29-22n-1w, dry at 5,139 ft., Simpson top 4,995 ft., Wilcox 5,048 ft.
Payne County: Skelly Oil 1 Simpson, SW SW SE 30-19n-5e, 38,500,000 cu. ft., gas, R.P. 1,250 lb., Misener sand 3,648 ft., Viola 3,674 ft., Wilcox 3,713 ft., T.D. 4,086 ft., P.B. to 3,680 ft.

LA.-ARK.

New Producing Areas in Claiborne and Tensas

SHREVEPORT, La.—Arkansas Louisiana Gas Co. has opened a new gas-producing area in North Louisiana 15 miles southeast of the Lisbon field. After opening up a 50,000,000-cu. ft. gas production in James lime at about 4,750 ft., gas was developed in the Pettit sand at about 5,200 ft. and the Travis Peak at 5,700 ft. and in sands at 5,800 and 5,900 ft. The well was not yet completed.

An interesting outpost to the Holly Ridge pool in Tensas Parish is Chicago Mill & Lumber Co. 1-A fee, in 12-11n-9e, about 2 miles northwest of the Carter Oil Co.'s discovery well. A drill-stem test recovered 16 ft. of prospective pay in the Wilcox at about 3,000 ft. The test was not continued, and drilling was resumed with the Tuscaloosa as the objective. The east offset to the discovery well in the Holly Ridge pool, Union Production Co. 1 Penrod-Jurden in 19-11n-10e, found the top of the Massive sand in the basal Tuscaloosa at 8,372 ft. and preparations were being made to core a 10-ft. section.

NORTH LOUISIANA WILDCAT COMPLETIONS

Claiborne Parish: Frankel Bros. 1 Muslow, 1,502 ft. E and 660 ft. S of NW cor, 30-21n-7w, 65 bbl. per day of 46.8 gravity oil. Cotton Valley 4,242-50 ft., T.D. 6,015 ft., P.B. to 5,261 ft.
Concordia Parish: Gulf and Danciger 1-A Nelins, C SW NE 10-1n-8e, dry at 9,838 ft., Heterostegina 2,350 ft., Vicksburg 4,258 ft., Wilcox 6,347 ft., Midway 9,634 ft.

ARKANSAS WILDCAT COMPLETION

Columbia County: Northern Ordnance 1 Waggoner, C NW NE 10-19s-23w, dry at 10,600 ft., Massive anhydrite 4,738 ft., Cotton Valley 7,810 ft., Buckner 10,367 ft., Smackover lime 10,465 ft.

MISSISSIPPI

Cranfield Pool Discovery Well Flows From Wilcox

JACKSON, Miss.—The California Co. ran completion gage on its 1 National Gas Co. of Louisiana, Inc., discovery well of the Cranfield field, Adams County, in 52-7n-1w. This field opener was completed in the Wilcox through perforations at 5,880-84 ft., flowing 180 bbl. pipe-line oil per day through 5/32-in. choke, tubing pressure 380 lb. Gravity of the oil is 44°, corrected. Total depth of the hole is 10,383 ft., 7-in. casing set on bottom. Prior to completing in the Wilcox zone it had tested gas-distillate in perforations 10,270-72 ft., oil and salt water from perforations 4,388-92 ft.

Gulf Refining Co. completed the 1 Aden Davis, discovery of Eucutta field, 2-9n-9w, Wayne County, as an oil-water pumper. With perforations at 6,666-72 ft., it pumped at the rate of 178 bbl. oil and 110 bbl. salt water per day, 2½-in. tubing with packer set 6,655 ft.

MISSISSIPPI WILDCAT COMPLETIONS

Hinds County: Pure Oil Co. 1 Gaddis Farms, 29-6n-3w, dry at 9,002 ft.
Lawrence County: William Helis et al 1 T. H. Dinkins, 2-5n-11e, dry at 11,448 ft. shale.
Wayne County: Humble O. & R. Co. 1 Robinson Land & Lbr. Co., 2-6n-7w, dry at 8,570 ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Cheyenne, Wyoming. Notice is hereby given that the land herein described within the known geologic structure of the East Lance Creek oil and gas field, Wyoming, is offered to the qualified bidder of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act as amended by the act of August 21, 1935 (49 Stat. 674, 30 U.S.C. 226), at a sale to be held in the District Land Office at Cheyenne, Wyoming, at 10 a.m. on November 4, 1943, as a single parcel: T. 36 n., R. 64 W., sec. 28, S½NW¼. The lease will be made subject to the unit plan for the East Lance Creek Unit Area, Wyoming, approved March 2, 1938. The successful bidder must deposit on date of sale with the officer in charge of the sale a certified check or cash for one-fifth of the amount bid by him and file a showing of qualifications to receive a lease as required by section 7 of Circular 1336. The remainder of the bonus bid and annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Bids may also be submitted by mail provided they are accompanied by one-fifth of the bonus bid and a showing of qualifications of the bidder. The envelope must be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. William G. Johnson, Register

WILDCATS AND DISCOVERIES

COMPARED with the potentialities indicated by uncompleted wildcats, the actual discovery wells completed last week were of little importance. Nine of these wildcats showed oil and one was a gas well. The most interesting discovery was the Helis well southeast of Devers and north of the Hankamer field in Liberty County, Texas. The pay is in the Yegua, which was found dry at Hankamer but produces in the Hardin field about 18 miles to the northwest. The oil is of lower gravity than at Hardin.

In Archer County, North Texas, McCarty & Coleman opened a new Ellenburger producing area 4 miles from Hull-Silk. The good flow recorded by this well indicates an important producing trend southwest of Hull-Silk and further development is anticipated.

Illinois' five discoveries were of small size, two being extensions to the Plainview and Rinard pools, respectively. A small pumper opened a new producing spot in northern Clay County near the Effingham County line and another Devonian pool was opened in Madison County by Eason 1 Rence. This well, however, made about 40 per cent water. The fifth successful test was a McClosky well southeast of the Kell pool in Jefferson County.

Another spot was opened in Union County, Kentucky, and a small pumper represented Michigan's discovery. This well is in Enterprise Township, Missaukee County.

The remaining discovery was a gas well in Payne County, Oklahoma, just east of the old Ingalls field.

WILDCAT COMPLETIONS

	Week ended October 23, 1943					Cumulative total for 1943				
	Oil	Distillate	Gas	Dry	Total	Oil	Distillate	Gas	Dry	Total
Ohio	0	0	0	3	3	4	0	20	45	69
Indiana	0	0	0	0	0	3	0	0	48	51
Kentucky	1	0	0	4	5	19	0	2	105	127
Illinois	5	0	0	4	9	63	0	3	334	400
Michigan	1	0	0	0	1	10	0	1	124	135
Kansas	0	0	0	5	5	51	0	1	295	347
Nebraska-Missouri-Iowa	0	0	0	2	2	0	0	0	22	22
Oklahoma	0	0	1	3	4	37	1	17	218	273
Texas:										
North Central	1	0	0	8	9	47	0	1	292	340
West	0	0	0	3	3	10	0	1	68	79
Panhandle	0	0	0	0	0	0	0	0	5	5
East	0	0	0	4	4	5	0	2	87	94
Gulf Coast	1	0	0	2	3	5	7	6	92	110
Southwest	0	0	0	7	7	21	11	3	229	264
Total	2	0	0	24	26	88	18	13	763	892
Louisiana:										
North	1	0	0	1	2	5	0	3	59	67
Gulf Coast	0	0	0	0	0	12	6	1	26	45
Total	1	0	0	1	2	17	6	4	85	112
Arkansas	0	0	0	1	1	2	0	0	55	57
Mississippi and Southeast	0	0	0	3	3	3	0	0	52	54
Montana	0	0	0	1	1	4	0	1	21	26
Wyoming	0	0	0	0	0	6	0	0	15	21
Colorado, Utah	0	0	0	0	0	0	0	1	4	5
New Mexico	0	0	0	0	0	5	0	2	22	29
California	0	0	0	1	1	5	0	9	116	130
Total United States	10	0	1	52	63	317	25	74	2,334	2,750
Total previous week	8	0	2	66	76					

Facilities Expanded in Middle Eastern Fields

(Continued from page 29)

"We want more men from small companies for this staff," Mr. Davies said, "but they simply are not available."

Asked about small-company representation on the PIWC and its committees, the investigators were told that the membership is split approximately 50-50 between major and minor companies, with the council as a whole predominantly minor.

The reason for his questions, Representative Brown pointed out, was a report that major oil companies have lost 18 per cent from rationing, individual marketers have lost 58 per cent as a result of the rationing program.

Following a recess of the committee, Mr. Davies protested that the previous questioning had implied that his staff was made up predominantly of major-oil-company men whose interests still lay with their oil companies rather than the Government. "All of these men," he said, "have severed their connections with oil companies and are here on a full-time basis, and I have no reason to question the integrity of any one of them."

Representative Brown then read a statement clarifying his questioning, and assuring Mr. Davies that he did not question Mr. Davies or his staff, but he was interested in finding out how well small oil operators in all branches of the industry were represented in policy making agencies.

Other highlights brought out in the first sessions included:

Labor.—Dr. Frederick H. Harbison, supplementing Mr. Davies' report that the labor situation so far has not been serious, told the committee that the industry faces a shortage of drilling personnel. Cooperating with the War Manpower Commission, a plan is now being worked out to return some trained oil workers who have gone into shipyards and other war plants. There is no current shortage of men engaged in maintenance and production, although the father draft may affect pumpers and other key personnel.

Staff difficulties are anticipated in new plants, and a staffing plan has been worked out in Texas and Colorado to operate war plants when they are completed.

Profits.—Mr. Davies said that it was his impression that oil companies will show a larger profit than last year, most of it going to large operators. The profits are chiefly the result of increased volume, and the benefit is not evenly spread, as the small producer cannot benefit in the same proportion. Today's profits, Mr. Davies said, are not indicative of what the oil industry can look forward to.

"We are producing wide open and liquidating our assets," he said.

Exploration.—The oil industry is doing as much exploration as before,

but it costs more and isn't as productive. The 296,000 stripper wells, he said, account for 15 per cent of production.

Chairman Jones of the PIWC committee on transportation said that while the transportation bottleneck has been broken, and that all available oil supplies can be moved to the East Coast for the armed forces, industries and consumers, this cannot be assured to all civilians.

Questioned on pipe line and other projects, Mr. Jones said the 19 pipeline projects in the program are 80 per cent complete. Of these, the big-inch and little big-inch are the largest.

The barge-line program has progressed slowly, chiefly because of steel requirements and questions of economy. Of the 500 concrete barges originally planned, 50 have been built.

Tank cars have been maintained in good repair.

Tanker transportation, reduced from 1,400,000 bbl. a day in January 1941 to less than 200,000 in January of 1942, and down now to a little over that figure, is improving slightly.

Questioned about the capacity of modern tankers, in relation to pipeline capacity, Mr. Jones said that the most modern tankers, of which few are available, carry 160,000 bbl., the average being 130,000 to 150,000 bbl.

Asked why the oil companies did not go ahead with the project of building pipe lines as they originally contemplated, Mr. Jones said it was largely because government regulations and changing circumstances made it seem unwise at the time.

Representative Brown asked if any plans were made for disposing of government-owned pipe lines after the war, and was told that none had been announced so far. The big-inch and little big-inch cost $70,000,000 each, and would after the war be worth what changing circumstances produce, Mr. Jones said. "Congress will determine their value after the war."

It is no secret, Mr. Jones said, that many oil companies felt that the pipe lines were an entering wedge for Government in the oil industry. For that reason, he admitted, the oil companies might be willing to pay a fair price for them after the war.

Oil transportation through the big-inch is as cheap or cheaper than by tanker, Mr. Jones said.

Government has paid about 40 per cent of the extra cost of transportation during wartime over previous methods.

In discussing the price situation, Mr. Gill told the committee that when the facts regarding the present condition of the oil industry are brought together and integrated they clearly indicate the need for upward adjustment of prices.

Under the price-control laws, he said, an increased price can be justified only if it is needed to increase production or to correct gross inequities, and he attempted to prove that a crude-price increase is justified on both these grounds. For the most part he briefly reviewed published statements which the PIWC has filed with the Office of Price Administration, and referred the committee to various passages of these documents for detailed statistics and argument.

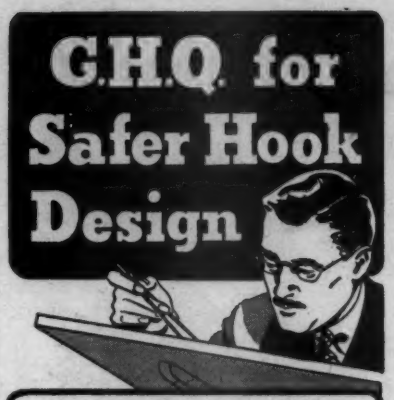
Production can be increased, he said, by retaining and rehabilitating stripper wells, by secondary-recovery methods, by drilling marginal locations in proven fields, and by new discoveries. In the past the stimulus to any or all of these methods has been a price high enough above the costs to provide a reasonable profit. It is impossible to calculate how much of a price increase is needed at this time, nor how much additional oil would be produced by a given price increase, but the 35-cent per barrel rise asked by PAW should be tried.

Statistics of wildcatting have been abused to indicate that the present crude price is no impediment to drilling, Doctor Gill said. This interpretation, he added, loses sight of the result of wildcatting, the discoveries of new oil. At the present rate of discoveries, he said, we will find about 939,000,000 bbl. of new oil this year, but this will be 500,000,000 bbl. short of our actual production, and the law of averages indicates that we should drill 1,980 more wildcats than will be drilled.

Turning to "gross inequities," which he admitted is difficult to define, Doctor Gill pointed out that the price of crude was frozen at a subnormal level which, because of various happenings in the oil industry during the several prior years, had failed to rise sufficiently to cover increasing cost trends. He argued that therefore the "hold the line" policy is not strictly applicable to crude-oil production.

Oil-company profits this year are fictitious, he said, because they omit costs which normally would have been made in peacetime, particularly the cost of drilling dry holes which were not drilled but which would have been drilled if it were not for wartime restrictions and conditions.

Asked by Chairman Lea what the price of crude would be now if there were no OPA ceilings, Doctor Gill stated that some producers estimate it would be between $1.75 and $2 per barrel, and that if it had just kept pace with the raw materials price index it would now be $1.57 per barrel as compared with its present average of $1.19 per barrel. He added that if a crude-price increase of 35 cents per barrel were passed on to consumers it would mean an increase of 0.85 cent per gallon in the price of all petroleum products, and would increase the cost-of-living index by only 85/1,000 of 1 per cent.



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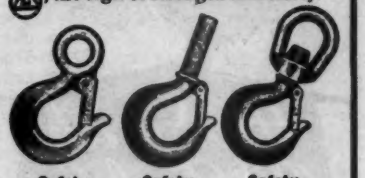

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The Safety Hook That's Really Safe

A safety latch (as illustrated) is available on all sizes and styles of Laughlin Hoist Hooks. The properly designed, stout-springed safety feature securely traps the sling — no hazard of accidental slipping or jolting off.

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Well known to shipping men, this hook is designed for a straight pull. It is as strong as a standard hook twice its weight.

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Among the Drilling Contractors

John E. Mabee, Midland, Tex., has spudded and set 12½-in. casing at 278 ft. at 1 Mabee, which it will drill for Mid-Continent Petroleum Corp. in the G.&M.M.B.&A. Survey of northwest Martin County, Texas. This wildcat test is 8 miles northeast of the recent discovery of Texas Co. on the Mabee ranch in southeast Andrews County. Projected depth is 7,500 ft.

Taggart Brothers Co. has contract to drill Pure Oil Co. 1 Pere Marquette R.R. Co., in C S½ SE NW 11-20n-5w, Clare County, Michigan.

J. C. Arthurs, Inc., of Bay City, Mich., has contract to drill Freeman Oil Co. 1 Mike and Carrie Kalinowski and John Pelkey, in C S½ SW SW 9-16n-3e, Bay County, Michigan.

Baldridge & King, of McAllan, Tex., have skidded derrick to location for Texas Co. 2 Yturria, in Share 59, San Juan de Carricitos Grant, Willacy County, Texas. The location is 7,900 ft. west of 1 Yturria, which was abandoned at total depth of 8,516 ft., and is 8 miles north of Raymondville. Texas is drilling these tests on a 7,324-acre lease.

M. J. Delaney, Dallas, Tex., is the contractor for 1 Woodley Petroleum Co. which it will drill for Tide Water Associated Oil Co. in the SE Section 62, northwest Gaines County, Texas. This wildcat, projected to go to 5,700 ft., is 2½ miles west and 1¼ miles south of the nearest production in the Wasson field. Work has been started.

Taubert & McKee, Fort. Worth, Tex., have the contract to drill 1 E. M. Wiley, a wildcat test, for Roy Goldston, 3 miles southwest of the Quitman pool, in Wood County, Texas. The location is on a 1,250-acre block assembled by Rube Benton, of Fort Worth, who was instrumental in the drilling of the Delta-Shell 1 Goldsmith discovery. The 1 Wiley is scheduled to go to 6,500 ft.

Kirkpatrick Drilling Co., of Corpus Christi, Tex., has contract to drill H. and G. R. Brown and J. C. Karcher 1 H. P. Guerra, wildcat in Porcion 56, Juris of Mier, Starr County, Texas. It is a 5,000-ft. test about 17 miles north of Roma. Rig will be moved to this location from the Lockhart field.

M. L. Massingill will move one of his rigs to his location, to be drilled in partnership with W. H. Spice, 1 Carlos M. Palacios estate, about ¾ mile east of the Randado field, Jim Hogg County, Texas. This test is on farmout acreage from Arkansas Fuel Co.

J. O. Ruhl, of Beeville, Tex., partner of W. H. Stice, is rigging up Texas 1 Manley, southwest outpost test at Collier field in Jackson County, Texas, in James Kerr Survey A-39.

A. D. McDannald of Houston, Tex., has the contract for the Texas Co. 1 A. D. Middleton, about 4 miles north of High Island, in Chambers County. Texas, in R. M. White Survey A-399. It is a 9,000-ft. test. McDannald has just completed a well for Humble on the east flank of the Katy field, the 1-B Alexander, in Section 79, H.&T.C. Survey, Harris County.

James Collins has the drilling contract on W. H. Clock 1 R. Clark, in SW SE SE 3-13n-3w, Isabella County, Michigan.

S. P. Todd, of Houston, Tex., has spudded and set surface casing be-

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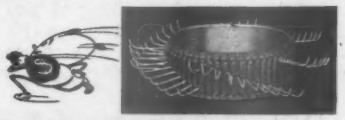

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Houston, Texas. Phone: Preston 9783

low the dangerous surface sands in Cities Service 1 Sharman, wildcat about 10 miles northwest of Houston, in W. H. Mowery Survey A-1419. Surface casing was set below 1,700 ft.

Noble Drilling Co. is the contractor on the California Co. 13 Delta Farms, 1,000-ft. test in the Delta Farms area of La Fourche Parish, Louisiana, located in 31-16s-23e.

N. R. Dodd has been awarded contract on Carl E. Grimes 1 Dykhuis & Pelon Comm., SE SE NE 3-4n-15w, Allegan County, Michigan.

George Callihan, Alibene, Tex., has contract to drill Forest Development et al 1 Robertson, 4,000-ft. wildcat in SW SW Section 18, Block B-8, E.L. &R.R. Ry. Survey, southwest Crosby County, Texas.

Grey Wolf Drilling Co., Houston, Tex., has moved in on Brown & Wheeler and W. J. Weaver 1 Gibson, 10,000-ft. wildcat test in Navarro County, Texas.

Wheeless Drilling Co. has the contract on a deep test on the J. M. Walker tract, A. G. Walling Survey, 8 miles northeast of Henderson, Tex. The well will be a Travis Peak test.

Union Rotary Corp. will drill on contract the Ohio Oil Co. 1 Alvin Harrrington, in C N½ SW SE 22-10n-10e, Lapeer County, Michigan.

Ashby Drilling Co. has drilling contract on C. L. Maguire, Inc., 1 Sherwood estate, in C S½ NE SE 36-19n-10w, Montcalm County, Michigan.

B. M. McGraw, drilling contractor, has completed the Carter Oil Co. 1 Henry Skiles, in Posey County, Indiana, and is rigging up rotary tools on the No. 2 location. The contractor is drilling below 1,500 ft. on the 1 Margaret Drury, Union County, Kentucky, for Carter.

Comanche Drilling Co., Blackwell, Okla., recently completed a well for George T. McNeish in SW NE SE 14-33-5e, Cowley County, Kansas, and is now drilling at 2,750 ft. on well for H. E. "Jock" Garden, in NE 13-34-5e. The company also has contract for a 3,000-ft. test in E½ SW 7-34-6e, for Hooper-Byrne Co., Wichita, Kans., the well to be started as soon as the Garden well is finished.

T. F. Caldwell, Inc., has been awarded drilling contract on C. E. Weller and T. F. Caldwell, Inc. 1 James Davidson, in C N½ NW SW 36-11n-3w, Gratiot County, Michigan.

Goll, Graves & Mechling have the drilling contract on Basin Oil Co. and Don F. Rayburn 1 Welbo Comm., in S½ NW NW 8-19n-4e, Arenac County, Michigan.

Call Issued for Drillers to Carry Out 1944 Program

DALLAS, Tex.—Following approval by the War Labor Board of uniform wage brackets for all oil-well drilling occupations throughout the Mid-Continent region, drilling contractors have been asked to provide the American Association of Oilwell Drilling Contractors with names and addresses of skilled drilling workers now employed in other defense industries.

The association points out that the 1944 program calls for more than 24,000 new wells and that skilled drillers must be recruited at once to carry out this program. The association, with headquarters in the Gulf States Building, Dallas, Tex., will act as intermediary between the drilling contractors and the War Manpower Commission.

The WMC is working out a plan to assure full-time employment, with overtime, for all drilling workers by advance scheduling of drilling operations and by cooperative exchange of drillers among contractors.

Commenting on the action of the WLB, Acting Petroleum Administrator Ralph K. Davies said: "Men and materials are two of the factors affecting the drilling of the new oil wells that we need so desperately to offset the shortage of crude oil that faces us. The PAW is attacking both of these problems in every possible way and we are gradually solving them. Materials, in cooperation with the War Production Board, are being made available for all of the wildcat discovery wells that anyone is willing to drill, and for the wells necessary to complete the development of present fields."

Constructing Gunite salt water disposal pits in East Texas oil field.

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For shallow drilling, running tubing, setting packers and liners, fishing—wherever minimum rig-up time and maximum portability are essential, the Martin-Decker "CLIPPER" Tool Pusher Type Weight Indicator is the instrument for the job. It combines in one compact, streamlined unit complete accuracy, portability and adaptability for all drilling and production operations not requiring a chart record.

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Extremely Accurate
Completely Self-Contained

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PERSONALS

M. J. KIRWAN

Named to New Post In Oil Division of Cities Service

M J. KIRWAN, who has been made manager of production for the oil division of Cities Service Oil Co., Bartlesville, Okla., is a director of the company and is an important figure in oil activities outside that organization. He is a member of the District 2 secondary-recovery committee by appointment of Petroleum Administrator Harold L. Ickes, and he is a member of the general committee, Division of Production, American Petroleum Institute, which supervises work of the Institute pertaining to oil-production practices.

Mr. Kirwan has been associated with Cities Service since August 1941, when that company and Indian Territory Illuminating Oil Co. were consolidated. Before that he had held positions with Associated Oil Co. of California; California State Mining Bureau; Nippon Oil Co. of Tokyo, Japan, and U. S. Bureau of Mines, in Bartlesville, Okla.

Two stars adorn the service flag in the Kirwan home in Bartlesville. One is for a daughter, an ensign in the WAVES, and the other is for a son in the Naval Reserves. Another son, M. J. Kirwan, Jr., is an attorney for Cities Service in Houston, Tex.

Ray Elo has been promoted to process foreman at Standard Oil Co. of Ohio's Latonia, Ky., refinery, succeeding **James S. Dalton** who was transferred to the company's Cleveland, Ohio, plant. **Martin W. Conaway**, formerly in the technical service division, has been made assistant process foreman at Latonia.

Mark H. Haynes, formerly employed in the Wichita, Kans., natural-gasoline plant of Cities Service Oil Co., has been made superintendent of the company's Stone plant, near Haven, Kans.

Wray Richards, drilling contractor and tank builder in South Texas oil fields, is confined to his home in Luling, Tex., after suffering a partial stroke October 10. His condition showed marked improvement this week, and complete recovery was looked for.

Kenneth Hagen, landman for Margay Oil Co. in Oklahoma, recently was transferred to the Midland, Tex., district.

George O'Brien, vice president of the Standard Oil Co. of California with offices in Los Angeles, is entertaining **Amir Faisal** and **Amir Khalid**, sons of **Abdul Aziz Ibn Saud**, king of Saudi Arabia, where California Arabian Standard Oil Co. has developed large production of crude oil and has erected a refinery. Amir Faisal, second son of the king, is Foreign Minister of Saudi Arabia and Viceroy of the Hedjaz.

R. G. Greene, who resigned several years ago from Union Oil Co.'s geological department to accept a position with Union Pacific Railroad Co., has returned to Union and will represent the company in the Rocky Mountain district.

James N. Gregory, exploitation engineer for Shell Oil Co., Inc., at the Los Angeles, Calif., office, has been appointed field engineer at Oilfields, Calif., San Joaquin division.

Maj. Wiley H. Butler has been appointed commander of the San Francisco, Calif., suboffice of the Fuels and Lubricants Division, Office of the Quartermaster General. Major Butler's office will supervise procurement, storage and distribution of all petroleum products, except a minor list of specialties.

Oliver C. Field, president of the O. C. Field Gasoline Corp., Los Angeles, Calif., and a director of the Huntington State Co., has been elected a director of Consolidated Steel Corp.

A. N. Mackenzie has been appointed district geologist for the Petroleum Administration for War in District 3, with headquarters in Houston, Tex. He will have charge of the petroleum exploration problems of the administration in that district.

Frank P. Donohue has been appointed district director of reserves for the Petroleum Administration for War in District 2, with headquarters in Chicago. He will direct the work of the Division of Reserves and act in a liaison capacity between the PAW and the District 2 industry committee.

Robert S. Lytle, Los Angeles, Calif., who is developing several properties at Coalinga Nose, Pleasant Valley, Kettleman Hills and other fields in California for the Doheny interests, Seaboard Oil Corp. and Honolulu Oil Corp., was not quite satisfied with a deal made last week by a burglar who ransacked his home and left a revolver.

Raymond Deitmaring has been promoted to foreman of the pipe shop and insulating department at Standard Oil Co. of Ohio's Latonia, Ky., refinery.

Dr. George Hanson has been appointed chief of the Geological Survey of Canada, succeeding **Dr. G. A. Young**, who was superannuated last March.

Anson G. Phelps, traffic manager of Standard Oil Co. of New Jersey, retired last week under the company's

ANSON G. PHELPS

E. D. SHEFFE

annuity plan after 42 years of service. **Edward D. Sheffe**, assistant traffic manager, moves up to take Mr. Phelps' place. Standard's retiring traffic chief

has spent his entire business career with the company, having started as an office boy in 1901. He became manager of the traffic department in 1933. Mr. Sheffe joined the Standard organization in 1912 as a rate clerk and advanced to become assistant traffic manager in 1933.

F. Ira Moore, of the cracking coils department at the Baytown refinery of Humble Oil & Refining Co., retired in October, as he reached his sixty-fifth birthday. He had been with the company since 1920.

Paul L. Chapman, promoted from assistant superintendent to division superintendent of Stanolind Pipe Line Co., has been transferred from Stafford, Kans., to the company's temporary office at Brownfield, Tex.

W. O. LINDSEY

W. O. Lindsey, assistant to the treasurer of War Emergency Pipelines, Inc., at Cincinnati, Ohio, has been inducted into the Army at Fort Thomas, Kentucky. Over 100 employes of WEP, led by **Burt E. Hull,** vice president and general manager, honored Mr. Lindsey with a farewell dinner at the Netherland-Plaza Hotel. As a token of appreciation, he was presented with a $100 war bond. Before joining WEP, Mr. Lindsey was agent for Texas Co., at Wichita Falls, Tex.

P. C. McConnell, superintendent of development and production for Bahrein Petroleum Co., Ltd., returned from the Near East to his company's headquarters in San Francisco, Calif., last month. He has been in the Persian Gulf area during most of the past 9 years. After a short vacation in southern California, Mr. McConnell plans to continue his work with Standard of California interests.

Sanford Hall, formerly with the drilling division field staff of Burmah Oil Co., Ltd., and one of the last Americans to leave before the Japanese invasion, has accepted an assignment with the Wah Chang Corp. for a project in China in connection with the properties of the Yung Li Chemical Industries, Ltd. He is reported now en route to his new post.

O. P. Hanes, former newspaperman has been made public relations manager of Lion Oil Refining Co., El Dorado, Ark.

G. M. Johnson, of Fort Worth, Tex., has been appointed superintendent of the Texas division, pipe-line department, of Sinclair Refining Co., with offices in Fort Worth. Mr. Johnson, for 23 years in the service of Sinclair and the old Prairie Pipe Line Co., was formerly division engineer.

Charles N. Adkisson, Jr., petroleum engineer, formerly associated with A. W. Adkisson in Fort Worth, Tex., has been promoted to captain in the Army Air Corps, assigned to Fort Sill, Oklahoma.

R. C. Crase, of Humble Oil & Refining Co., spoke on "Development and Control of Oil Reservoirs" at a meeting of the Houston Geological Society last Thursday in the Texas State Hotel. The talk was supplemented by slides showing operating data on typical fields, illustrating the mechanics and technical principles underlying reservoir behavior.

George O. Carr, of Midland, Tex., employed in the geological department of Shell Oil Co., Inc., until he enlisted for Army service in 1940, has been cited for the Purple Heart. Private Carr, a paratrooper, was with the first detachments to invade Sicily and Italy, and he suffered injuries in each operation. He is recovering in an Army hospital in North Africa.

Maj. Joe R. Williams, employed in the general accounts office of Humble Oil & Refining Co., Houston, Tex., before joining the Army Air Forces in July 1941 and now commanding a squadron of P-37 Thunderbolt pilots based in England, has been awarded the Air Medal. He was promoted to major last month after completing an important mission. After initial training in California he was commissioned at Luke Field, Arizona, in February 1942.

J. M. Wadsworth, who is plant manager of the Lion Chemical Co., El Dorado, Ark., spent several days in Tulsa and other Mid-Continent points this week. Mr. Wadsworth for several years was connected with the Foster Wheeler Corp. and formerly operated refineries in the Mid-Continent area.

M. L. Hurst, mechanic at the refinery of Lion Oil Refining Co., has been awarded a 17-jewel watch by the company for his record of working 15 years without a lost-time accident.

Dr. A. S. Huey has been transferred from the Great Falls, Mont., office of Shell Oil Co., Inc., to the company's geological and land department in Billings, Mont. He is succeeded in Great Falls by **H. J. Buddenhagen,** geologist; and **Clifford Barkell,** graduate of the Montana School of Mines, has joined the Great Falls staff as an assistant. Dr. Huey will be associated with **G. E. Miller,** chief of Shell's Rocky Mountain geological department, and **Allen Cree,** geologist.

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Market Developments

East Coast

NEW YORK.—Improvement in the inventory position of distillate fuel oil in the last few weeks has substantiated predictions that the heating-oil situation on the East Coast this winter would be better than a year ago. The latest report on distillate fuel-oil yields for the refining districts which supply the northeastern consuming area revealed them to be 16.8 per cent currently, against 17.7 per cent a year ago.

On the other hand, residual fuel-oil yields are up to 28.3 per cent against 24.5 per cent last year with the result that stocks are in a highly satisfactory position.

Motor fuel, though less critical than a month or 6 weeks ago, remains in the least favorable position of the more important volume products.

The over-all position on the East Coast continued to improve as reflected by the A.P.I. index of available civilian supply which moved up to 48.0, an increase of 1.7 points. District 1 stocks are now less than 20 per cent lower than a year ago.

Inauguration of deliveries via the New York district leg of the big-inch line which are expected to reach capacity this week has contributed much to East Coast improvement.

Mid-Continent

MID-CONTINENT refiners expressed a little more optimism concerning crude supplies this week, following assurance that plenty of tank cars are now available and that steps have been taken to obtain Government reimbursement on freight charges through the Defense Supply Corp. Crude shortages have assumed a serious aspect at some plants. One large independent refinery in Oklahoma was reported to need 1,500 bbl. more daily in order to run at capacity. Needs of Kansas refiners were said to be even more urgent than those in Oklahoma.

The increased supplies of crude to be made available through additional tank cars will come from West Texas. Not all refiners have equipment capable of handling crude of high sulfur content such as that from West Texas fields, but most of them can meet the problem by mixing it in low proportion with sweet crude.

Recent rains have stepped up fall plowing and planting operations in agricultural areas, with consequent rising demand for gasoline for tractor use. Northern farmers, especially those who use regular-grade motor fuel, are having trouble getting needed supplies.

Burdensome inventories of heavy residual fuels were said to present a slightly less knotty problem this week. The more encouraging outlook was attributed in part to last week's action of the Petroleum Administration for War, authorizing industrial consumers of residual fuel oil to suspend conversion of their facilities to other fuels. It was predicted that some industrial plants which had been forced to use coal because of the former shortage of heavy fuels would be able to return to their original fuel.

Gulf Coast

HOUSTON, Tex.—Definite improvement in the movement of crude oil and petroleum products in coastwise tanker routes, known in the trade circles here for several weeks, was confirmed last week in Washington, D. C., by W. Alton Jones, chairman of the PIWC transportation committee. He testified that tanker movement in September was around 210,000 bbl. daily, the highest rate attained since August 1942.

The increased use of marine facilities is a partial explanation of the current shortage of motor fuel in the Gulf Coast refining district. Most plants are working on a day-to-day delivery basis with stocks at several points below the previously conceived minimum operating level. Shortages of natural gasoline persist, particularly in the Corpus Christi area as larger volumes of the lighter components inherent in the product are recovered for war materials.

Residual fuel oil is moving at a moderately increased rate. Early phases of the citrus fruit harvesting season have stimulated consumption by railroads and freight vessels. Some plants, however, are still hampered by excessive stocks of heavy fuels.

Movement of light oils was increased somewhat this week, reflecting the advent of colder weather in the northern states. Stocks of light burning oils are satisfactory at most plants and operators are circumscribed chiefly by shortages of transportation facilities.

Shipments through the 20-in. products line for filling the artery to Norris City, Ill., the intermediate terminal to which construction has been completed, are moving regularly and will place an even greater strain on supplies of motor fuel.

Pacific Coast

LOS ANGELES, Calif.—The liquid petroleum gas situation has gotten tight in California during the past several months and every indication points to the probability that shortages will continue indefinitely. Demand for this product shows a substantial increase during the winter. The public utility companies are anticipating the establishment of a new peak demand this year and have attempted to anticipate this condition. The large increase in population in southern California will keep the various gas companies very busy during the coldest days and nights. Some of the dry-gas fields will go on winter production early in November and from that time until early next year the number of dry-gas wells on commercial production will increase. Some consideration has been given to the possibility of a cold winter which would require smudging operations at a time when there is not any too much smudge oil available.

It is too early to determine what effect the reduction in coupon value will have on gasoline sales and the status of service stations. This will not become clear until some time in December because motorists filled tanks just before the reduction in values from 4 to 3 gal. weekly. August gasoline sales were 5.5 per cent below gallonage for the same month last year, but with a tightening up in B and C coupons and the reduction of 1 gal. in A coupon values there is a possibility that sales for November will show a larger reduction.

A.P.I. REFINERY REPORT

Week Ended October 16, 1943

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	177	2,044	403	1,025
Ind., Ill., Ky.	747	13,622	3,291	6,106
Okla., Kan., Mo.	358	6,148	1,645	2,462
Censored area*	2,079	30,198	18,672	20,314
Rockies	99	1,137	723	430
California	757	15,033	40,964	11,900
Total 10-16-43	4,171	68,182	65,518	42,237
Total 10- 9-43	4,094	69,708	66,585	41,304
Total 10-17-42	3,708	76,587	78,762	47,258

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
October 16, 1943	233,997,000
October 9, 1943	233,471,000
October 17, 1942	236,118,000

*Excludes unrefinable California stocks.

Refinery Prices

(Prices as of October 28, 1943)

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†60	74-75	70-72	68-70	62-66
Mid-Continent*	...	...	6.000	...	5.625
Pennsylvania	...	6.750-7.000	...	...	...
Gulf Coast	6.00-6.50	...	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	...	9.2	9.2	...
California	6.750-7.500	6.250-6.500	6.125-6.250	5.750-6.125	5.125-5.900

*Basis Group 3. †1939 C.F.R. (research method). §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	...	...	4.500	4.375	...
North Louisiana	...	...	...	4.500-4.750	...
Pennsylvania	6.250-6.625	6.125-6.250	...	...	...
California	...	...	...	4.500-5.500	4.250
Northeast Coast	...	...	...	6.80	...
Gulf Coast	...	...	...	4.125	...

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	56 & above	Diesel bunkers	Residual Bunker C†
Mid-Continent*	4.125	...	...	...	...	$0.80-1.27
California	...	2.750-4.000	...	...	‡1.35-1.45	1.10-1.15
Gulf Coast	...	...	4.000	4.125	1.45	0.85-1.27
Northeast Coast	...	...	...	6.800	2.750	1.65-2.07
North Louisiana	...	...	...	...	...	0.80-1.27

*Basis Oklahoma Group 3. †Gravity range. ‡Pacific Specification 200

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625	3.500	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	...
Northeast Coast	6.7	6.7	1.95	1.85
California	5.5	5.5	‡1.10-1.35	‡1.10-1.15
Gulf Coast	3.750-3.875	...	1.35	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel. ‡Pacific Specification 300 §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	4.750	5.700
North Texas	4.375	5.250
North Louisiana	4.375	5.250
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D. 10-25	27.00
150-160 D. 0-10	23.00
120-125 D. 0-10	22.00

Steam refined:

600 dark green (untreated)	9.00

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)

10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00

Steam refined:

600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.00
650 flash	17.00	17.50

Neutral Oils

Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:

300-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 15-25 pour, quoted 0.5 cent under 0-10 oils.

CALIFORNIA—

300-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00

Neutral Oils

Red oils:

200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:

200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:

Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00

200 vis. at 70° F., 3 color:

Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt.	16.00	5.50	10.50
Buffalo, N. Y.	16.30	5.50	10.90
Dover, Del.	16.70	5.50	12.20
Hartford, Conn.	15.00	4.50	10.00
Manchester, N. H.	17.50	5.50	12.10
Newark, N. J.	15.30	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.00
Pittsburgh, Pa.	16.70	5.50	12.20
Portland, Me.	16.30	5.50	10.30
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.30
Average 14 cities	16.02	5.14	10.80

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Chicago, Ill	14.10	4.50	10.00
Cleveland	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	10.10
Detroit, Mich.	14.40	4.50	10.00
Fargo, N. D.	16.90	5.50	11.00
Huron, S. D.	16.30	5.50	11.00
Indianapolis, Ind.	15.00	5.50	10.10
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.00
Minneapolis, Minn.	15.90	5.50	10.00
Omaha, Neb.	15.40	6.50	9.00
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	13.30	4.50	8.70
Average 14 cities	17.46	5.57	9.84

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero tank wag
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	...
Charleston, W. Va.	19.25	6.50	13.20
Charlotte, N. C.	20.10	7.50	11.20
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	10.00
Norfolk, Va.	17.45	6.50	12.20
Average 11 cities	18.34	7.50	10.90

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	13.00

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero tank wag
Portland, Ore.	17.00	6.50	13.00
San Francisco, Calif.	14.50	4.50	11.00
Seattle, Wash.	17.00	6.50	13.00
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.59	5.96	10.93

AMONG EQUIPMENT MEN

Clark Appointed By Walworth Co.

E. Leland Clark has been appointed manager of sales for the Dallas, Tex., office territory for Walworth Co., succeeding the late Chester L. Bradbury, according to an announcement by Fred W. Duemler, vice president of the company. The appointment became effective October 20.

Campbell Joins Clark Bros. As Sales Manager

A. F. CAMPBELL

J. B. O'Connor, vice president, Clark Bros. Co., Inc., Olean, N. Y., has announced that Arch F. Campbell has joined the company as sales engineer.

Following his graduation from University of Michigan in mechanical engineering in 1918, he served a year as a flying officer in the Army. He then joined the production department of Phillips Petroleum Co. for 1 year and since that time has been associated as branch manager in charge of oilfield sales of Waukeska Motor Co.

Clark Elected Vice President Of Lucey Products Corp.

R. P. (Salty) Clark, special representative of Lucey Products Corp., Tulsa, has been elected a vice president of the company by the board of directors. Mr. Clark has had a varied experience in the oil business, having served as roughneck, tool dresser, equipment salesman, and for several years as advertising representative of The Oil and Gas Journal in California.

Well Head Manufacturers To Meet in Tulsa

The Association of Well Head Equipment Manufacturers will hold a meeting in Tulsa November 5, at 6:30 p.m., at the Tulsa Club.

Pearson Named Sales Manager Superior Engine Division of National Supply

National Supply Co. has announced the appointment of R. M. Pearson as manager of sales, Superior engine division.

Mr. Pearson has been affiliated with National Supply Co. since 1936 in the capacity of sales representative serving the marine trade and the inland waterways. He has been actively engaged in the sale of diesel engines for the past 20 years and served on the sales staffs of Fairbanks, Morse & Co.; General Motors Corp. and American Locomotive Co. prior to his service with Superior.

Nomad Meetings

Fred E. Cooper, of the Fred E Cooper interests, Tulsa, was the principal speaker at the monthly luncheon of the Tulsa Nomads, October 18. Mr Cooper spoke on operating conditions in Mexico.

Forty-one guests attended the October 11 dinner meeting of the New York Nomads. Seventy members were present. Fred Bate, of National Broadcasing Co., was the principal speaker.

Classified Advertising

ROYALTIES

WRITE us about Royalties in the Gulf Block in West Texas County, Oklahoma, also leases and acreage in the Hugoton Gas area. SPEAKMAN INVESTMENT COMPANY, LIBERAL, KANSAS.

EQUIPMENT WANTED

TWO 55,000-barrel Steel Storage Tanks. Give full specifications and whether riveted or welded, lowest price and location. Box B-843, The Oil and Gas Journal, Tulsa, Okla.

LEGAL BLANKS

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

EQUIPMENT WANTED

WANTED: Well servicing unit, either double or single drum. Please give full description, condition, location, power and price in first letter. Ford Chapman, Box 102, Pecos, Texas.

EQUIPMENT WANTED

WANT TO BUY—Light portable slim hole rig for 3000' of 7" hole. Sullivan Model 300 or Franks Machine FDM. Truck or skid mounted. Must be A-1. Write Oilman, 2105 Parkway St., Bakersfield, California.

--- WANTED ---
FORT WORTH SPUDDERS

We are having numerous calls for Fort Worth Spudders, which we cannot deliver because of manpower problems and war-time regulations. If you have a Fort Worth Spudder to offer for sale, list it with us, giving model, age, location, condition, price wanted, and also list equipment included. We will help you find a buyer.

When we return to normalcy, we expect to meet the demand with new Fort Worth Spudders

Well Machinery & Supply Company
1819 Main St.—Phone 3-2191 Fort Worth, Tex.

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Phone HArrison 1000.

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WANTED: Hot Oil Pump, Arrow Petroleum Co., 7419 Franklin St., Forest Park, Ill.

Classified Advertising

HELP WANTED

WANTED: Inspector. Experience preferred but not essential as we will train. Must be familiar with refinery equipment. Give details of experience. Box B-828, The Oil and Gas Journal, Tulsa, Oklahoma.

• • • • WANTED • • • •

Major oil company with continent-wide operations and research seeks graduate technical men of the following qualifications:

MECHANICAL ENGINEERS—with petroleum refinery or similar experience. Should be familiar with refinery design, estimating, construction, mechanical equipment, engineering materials, and utilities systems. Process knowledge desired although not essential.

CHEMISTS AND CHEMICAL ENGINEERS interested in research, design, or plant operation. Should have training and experience in refinery or other industrial organizations.

Work not of a temporary nature. In reply state experience, education, age, marital status, draft classification and salary expected, include small snapshot (not returnable). Replies strictly confidential. Applicants now employed at highest skill in war industries not solicited. Box B-676, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Chemist or Chemical Engineer to take charge of petroleum refinery laboratory. Located in East Texas. Outline experience, education, draft status, and salary in first letter. Box B-830, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: One Refinery Instrument Man—must be deferred. Rate 97c per hour; time and one-half for all over 40 hours, working 48 hours per week. Large Independent Texas Refiner. Box B-846, The Oil and Gas Journal, Tulsa, Okla.

CHIEF auditor for large independent refiner. Must be able set up complete accounting system and property records and have knowledge of depreciation, taxes, etc. State salary desired, complete experience record. W.M.C. certificate required. Address answers to P.O. Box 2007, Tulsa 1, Oklahoma.

MECHANICAL DRAFTSMAN DESIGNER, preferably with experience in truck mounted rotary drilling equipment. Must be capable of doing original layout work once given the problem at hand. Prefer graduate Mechanical Engineer. Applicants must have Certificate of Availability or referral card from U. S. Employment Service. Box B-852, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Graduate chemical engineer who has had operating supervision of modern type refineries. Good salary. Exceptional opportunity for an ambitious and capable man. Certificate of availability required. Correspondence confidential. Box B-853, The Oil and Gas Journal, Tulsa, Okla.

PETROLEUM PRODUCTION ENGINEERS to do research on fundamentals of performance of subsurface reservoirs, and on recovery of oil from formations. Background of advanced mathematics desirable. Applicants must have Certificate of Availability or referral card from U. S. Employment Service. Box B-851, The Oil and Gas Journal, Tulsa, Oklahoma.

NOTICE TO ADVERTISERS

Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

HELP WANTED

WANTED: Young man for Research Department, Petroleum Refining, who is a college graduate and deferred. Large Independent Texas Refiner. Box B-847, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

CONSTRUCTION SUPERVISOR, seventeen years oil field construction and rig building, installing all makes of machinery. Qualifications equal to an engineer. Age 38. Class 3 A-H. Box B-826 The Oil and Gas Journal, Tulsa, Okla.

GRADUATE Civil Engineer, age 33, with eight years varied experience, natural gasoline and petroleum transportation and construction problems. Married, two children, Draft Status 3-A. Now employed by major company. Change desired to secure permanent location. Box B-845, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Position in Power Plant, by man with twenty years experience as Power 7 Boiler House Foreman, for well-known oil refining company. Best of reference. 3-A Classification. Box B-840, The Oil and Gas Journal, Tulsa, Okla.

PARTY with capital wanted for southern Indiana oil proposition. Raymond A. Pfeiffer, Rockport, Ind.

INSTRUMENT MAN, young, 4-F in draft. Six years maintenance and construction experience oil and chemical refineries. Can supervise instrument department on operation or construction installation from blue print to operation. Now available. Box B-850, The Oil and Gas Journal, Tulsa, Oklahoma.

CONSTRUCTION and operating refinery superintendent with ten years experience running up to two thousand barrels per day, desires connection. Box B-858, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST-GEOPHYSICIST would like connection with major company or strong independent. Experienced in surface and subsurface geology, seismic and gravity interpretation. Now in non-essential work in Mid-Continent area. Age 41, married, one child. Box B-848, The Oil and Gas Journal, Tulsa, Okla.

DOES your organization need a young man that gets things done? A man equally at home with business men or laborers. With wide diversified experience in Business Management, Large Scale Hiring, Organization, Human and Racial Relations. A man used to large undertakings, making things hum both on the civilized home front and the raw frontier. (Draft exempt). Then write, Box B-857, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER: Five years engineering and three years lease work. Production and drilling experience in Mid-Continent, Permian Basin, and Gulf Coast. Graduate Oklahoma University. Married, two children. Desire work as a service engineer or engineering work with an independent or drilling contractor. Box B-854, The Oil and Gas Journal, Tulsa, Oklahoma.

IF you need help with NATURAL GASOLINE ACCOUNTING or GAS MEASUREMENT problems, why not handle these matters on a contract basis? Experienced, dependable service is available. Call 4-1220, Mr. Bell, Tulsa, Okla.

FOR SALE—MAPS

FOR SALE—MAPS

685 oil fields in South Texas and Louisiana now mapped and maintained daily; show all intimate details of ownership and development. 2 ft. square. $3.50 each. Also County and Base Maps.

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1944 will be your heaviest tax year. Retain us now to see to it that you pay only your just share. We specialize in the handling of all state and local taxes affecting the Independent Operator, Royalty Owner, and Drilling Contractor, in the states of Texas, Louisiana, Arkansas and Mississippi. We will also purchase oil and gas leases and royalty for you, with all information held strictly confidential. Write, wire or call.

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St. Louis, Mo.

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NEW MEXICO
State Oil and Gas Leases

TWO DEEP TESTS UNDER WAY—one a 7,500 ft. test; the other a 6,000 ft. test. 40 acres and multiples thereof for sale in the HoT SPoT. Write for information. HARRY S. WRIGHT, New Mexico State Lessee, Farmington, New Mexico.

NEW 55-acre, 10-year lease, located inside Paul H. Pewett's drilling block, Shelby County, Texas. Price $5 per acre. Write today for information. C. A. Parker, Box 451, Center, Texas.

FOR quick cash sale subject to core analysis, 320 acres with 26 producing wells, 8 abandoned wells, no dry holes, total depth 400 feet, gravity 29-30. Additional acreage can be leased to make a block of 250 acres proven for flooding, wells have been pumped for 20 years, no pressure ever applied to sands. Location, Miami County, Kansas. F. W. Black, Paola, Kansas.

MUST SELL 700 Acre Oil Lease, Medina County, Texas, now operating at loss account owner and operator overseas. Shallow sand production, many proven locations to drill. Excellent chance for experienced operator with small capital to build up a handsome monthly income. Liberal terms. Box B-855, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

ESTABLISHED laboratory in Tulsa equipped for core, oil and water testing. Excellent opportunity. Owner who operated this laboratory for thirteen years entering government service. Box B-859, The Oil and Gas Journal, Tulsa, Oklahoma.

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CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit 1, Mich.

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Many NEW OIL FIELDS were discovered by TORSION BALANCE surveys in years past, more are to be discovered. All different geophysical instruments possess special merits. TORSION BALANCE surveys contracted, reasonable rates. Modern instruments, experienced, capable, torsion balance field personnel. Expert interpretations. Address: Christian Iden, Geophysicist, or James P. Williams, Manager, 1740 Commerce Bldg., Houston, Texas. Phone: Charter 4-1926.

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PATENTS, Trade-Marks, Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1918. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

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Journalisms:

THE use of compressors in oil fields is increasing steadily and it is anticipated that this trend will be accelerated after the war. Great strides have been made in increasing the efficiency of compressor stations but there are still many changes that can be made in design and construction which will increase their efficiency. These will be completely covered in the lead article in next week's Engineering and Operating section. The author is B. C. Thiel, of the Cooper-Bessemer Corp.

A DETAILED layout for an A-C oil-well drilling rig has been prepared by E. H. Lamberger, industrial engineer, petroleum division, Westinghouse Electric & Manufacturing Co. This layout together with a table of equipment needed on wells to different depths will appear in next week's Journal.

IN the manufacture of codimer, considerable percentages of other olefins remain in the tail gases. How one company makes a high-octane-number polymer from these products by adding another catalyst chamber, a stabilizer and other accessory units is the subject of a staff article which will appear in next week's issue.

IT is not generally realized that Wyoming leads all other states in the amount of new oil found this year. In order to give its readers a picture of this important area, the Journal has sent Neil Williams on an extended tour of the district. Through the hearty cooperation of the companies operating in the district material has been collected on many developments ranging from drilling in the new Elk Basin-Tensleep field to secondary recovery at Wertz dome and the unit operation of Salt Creek.

The first of these articles, scheduled to appear in an early issue, deals with the difficulties encountered in the Elk Basin field with its hard formations and steep dips. The problem of obtaining water is also an important one in this area. With 150 proven locations to be drilled, this field promises to be one of the most active in the country. The newly discovered Gebo dome field at the south end of the Big Horn basin will probably be of the same type as Elk Basin.

CALENDAR

October

MID-CONTINENT OIL AND GAS ASSOCIATION, Louisiana - Arkansas division, Slattery Building, Shreveport, La., October 29.

November

SOCIETY OF AUTOMOTIVE ENGINEERS, Mayo Hotel, Tulsa, November 4-5.

ASSOCIATION OF WELL HEAD EQUIPMENT MANUFACTURERS, Tulsa Club, Tulsa, November 5.

CALIFORNIA NATURAL GASOLINE ASSOCIATION, fall meeting, Biltmore Hotel, Los Angeles, Calif., November 5.

AMERICAN PETROLEUM INSTITUTE, twenty-fourth annual meeting Palmer House, Chicago, Ill., November 8-11.

December

NINETEENTH EXPOSITION OF CHEMICAL INDUSTRIES, Madison Square Garden, New York, December 6-11.